



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

Harvard College Library



FROM THE
UNITED STATES GOVERNMENT

ANNUAL REPORTS, WAR DEPARTMENT

FISCAL YEAR ENDED JUNE 30, 1917

REPORT OF THE CHIEF OF ENGINEERS U. S. ARMY

1917

IN THREE PARTS

PART 3



WASHINGTON
GOVERNMENT PRINTING OFFICE
1917

Sci 1520.71

Harvard College Library
May 13, 1918.
From
United States Government



REPORTS OF DISTRICT ENGINEER OFFICERS

ACCOMPANYING THE ANNUAL REPORT OF
THE CHIEF OF ENGINEERS, U. S. ARMY

FOR THE

FISCAL YEAR ENDED JUNE 30, 1917.

(CONTINUED.)

III

ANNUAL REPORT OF THE MISSISSIPPI RIVER COMMISSION FOR THE
FISCAL YEAR ENDING JUNE 30, 1917.

OFFICE MISSISSIPPI RIVER COMMISSION,
St. Louis, Mo., July 12, 1917.

From: The Mississippi River Commission.
To: The Chief of Engineers, United States Army.
Subject: Annual Report for 1917.

The act of June 28, 1879, by which the commission was created, defines its duties in part, as follows:

To direct and complete such surveys of said river, between the Head of the Passes near its mouth to its headwaters, as may now be in progress, and to make such additional surveys, examinations, and investigations, topographical, hydrographical, and hydrometrical, of said river and its tributaries as may be deemed necessary by said commission to carry out the objects of this act. * * * To take into consideration and mature such plan or plans and estimates as will correct, permanently locate, and deepen the channel and protect the banks of the Mississippi River; improve and give safety and ease to the navigation thereof; prevent destructive floods; promote and facilitate commerce, trade, and the Postal Service; * * *.

Under the authority of this and subsequent acts relating to the subject, surveys and observations have been carried on and works of improvement under the authority and direction of laws making appropriations for that purpose have been undertaken and executed. The original project contained in the report of the Mississippi River Commission dated February 17, 1880, contemplated the permanent fixing and improvement of the channel to a depth of at least 10 feet at extreme low water by the contraction of the low-water width to about 3,000 feet, the protection of the banks against caving, and the control of the flood waters by means of levees. This report was the one upon which Congress made its first appropriation for the improvement of the Mississippi River under commission plans, thereby officially adopting such plans for the inauguration of this work.

When the Mississippi River Commission began the work of improvement there were few, if any, precedents of practical value to serve as guides in a project of such magnitude. But very meager data as to the regimen of the river was available, and a thorough knowledge of its many varying phases was essential before satisfactory comprehensive plans of improvement could be developed. Exhaustive surveys and observations of the physics of the river from the headwaters to the mouth were therefore inaugurated and carried on until the data needed was secured and experiments with various kinds of plant and material were also made in order to develop the equipment and type of construction needed for efficient work. This work necessarily occupied several years. During these years the appropriations were comparatively small, and sometimes failed altogether, with disastrous results to the channel works, so progress was

necessarily slow. As a result of the knowledge of the regimen of the river acquired and the lessons taught by the experimental work, definite projects are now entered upon with confidence of success, but efforts looking to improved methods to secure greater efficiency and economy will be continued.

The earlier works were designed primarily for the rectification and improvement of the channel, and were confined to the Plum Point Reach, 147 to 186 miles, and Lake Providence Reach, 517 to 552 miles below Cairo. These reaches were selected because here the shifting sand bars and deficient depths were most pronounced and the low-water navigation most difficult. Highly beneficial results were obtained in the improvement of the channel depths in those reaches, and the work done in them confirmed the soundness of the theory upon which it was based, but also demonstrated that more substantial types of construction were needed and that the permanent improvement of the channel by contraction and revetment works would necessarily consume a long period of time, while the pressing needs of commerce called for immediate relief. The development in hydraulic dredging machinery had reached such a stage at this time as to hold out the hope that an immediate and economical solution of the problem of temporarily deepening the channel for navigation purposes might be found in the opening and maintenance of channels across the obstructing bars at each low-water season by means of dredging. After extended studies and experiments, hydraulic dredges of large capacity, adapted to the peculiar service required, were developed by the commission, and this method of temporary improvement of the low-water channel was adopted with a view to maintaining a navigable channel not less than 250 feet in width and 9 feet in depth, and has been applied with success.

Since the adoption of dredging, the permanent work of channel improvement has been confined to the revetment of banks, and a type of revetment has been developed which successfully withstands the scouring action of the river. Concrete has been largely substituted for the upper bank revetment, and its use for sinking the present type of willow mat, as well as a possible substitute for the mat itself, is receiving careful attention with a view to further economy and increased efficiency.

The extent of bank revetment is, however, relatively so great when compared to the funds available for its construction that it has been necessary to confine the work to cases of urgent necessity, such as caving banks which threaten cut-offs or the safety of large levees which could only be replaced at excessive cost, and the harbor fronts of cities. Substantial revetment for the purpose of fixing the banks of the river is essential to any successful scheme of improvement, and as the project adopted by Congress requires that the commission shall "correct, permanently locate, and deepen the channel, and protect the banks of the Mississippi River," largely increased expenditures for revetment construction are urgently needed. The sum of at least \$4,000,000 could be economically and judiciously expended on this work annually.

One of the important items in the operation of the commission is the general repair and construction of levees, which was first authorized without qualifying restrictions by the act of September 19, 1890,

and since that date about one-half of the appropriations made by Congress have been devoted to that purpose.

Briefly stated in general terms and quoting in part the several acts of Congress under which the project is being carried out, the work now in progress covering the Mississippi River from the mouth of the Ohio to the Head of the Passes, 1,060 miles, includes "Continuing improvement with a view to securing a permanent channel depth of 9 feet" by means of:

1. Revetment of caving banks to "correct, permanently locate, and deepen the channel and protect the banks of the Mississippi River," and for the preservation of harbors and the security of levees.

2. Dredging, for the purpose of maintaining at all stages a "navigable channel 250 feet in width and 9 feet in depth," including construction, operation, and maintenance of suitable dredge boats and auxiliary devices and appliances therefor.

3. Construction, extension, and repair of levees from Cape Girardeau, Mo., to the Head of the Passes, 1,114 miles in cooperation with the several States and levee boards, to "prevent destructive floods" and "give safety and ease to navigation" of the Mississippi River at flood stages by facilitating the interchange of traffic, "commerce, trade, and the postal service."

4. The maintenance of a navigable channel between the waters of the Mississippi, Red, and Atchafalaya Rivers.

5. Physical investigations; maintenance of gauges and discharge measurements on the Mississippi River and its tributaries, preparation and publication of maps and physical data; surveys and investigations covering all phases of river regimen governing the work of channel improvement and flood control "from the headwaters of the Mississippi River to the Head of the Passes."

6. Other miscellaneous details incident to the execution of the general project.

LEVEE WORK ABOVE CAPE GIRARDEAU, MO.

The river and harbor act approved March 4, 1913, appropriated the sum of \$200,000 for the purpose of making an examination of the Mississippi River from Cape Girardeau, Mo., to Rock Island, Ill.—

with a view to such improvements as will at the same time promote navigation, develop water power, and protect property adjacent to said river from damage by floods; * * * and for the building of such levees between said points upon the river in aid of navigation as may be found necessary or desirable by the commission and approved by the Chief of Engineers.

The river and harbor act approved July 27, 1916, provides that—

any funds which are herein, or may hereafter be appropriated by Congress for improving the Mississippi River between Head of Passes and the mouth of the Ohio River, and which may be allotted to levees, may be expended, under the direction of the Secretary of War, in accordance with the plans, specifications, and recommendations of the Mississippi River Commission, as approved by the Chief of Engineers, for levees upon any part of said river between Head of Passes and Rock Island, Illinois, in such manner as, in their opinion, shall best improve navigation and promote the interests of commerce at all stages of the river.

The flood-control act approved March 1, 1917, provides in paragraph (c) of section 1 that—

any funds which may hereafter be appropriated under authority of this act for improving the Mississippi River between the Head of the Passes and the mouth of the Ohio River, and which may be allotted to levees, may be expended upon any part of said river between the Head of the Passes and Rock Island, Illinois.

EXTENSION OF JURISDICTION OF THE MISSISSIPPI RIVER COMMISSION.

The river and harbor act approved July 27, 1916, provides:

That the water courses connected with said river and the harbors upon it, now under the control of the Mississippi River Commission and under improvement, together with the harbor at Vicksburg, Mississippi, and the Ohio River from its mouth to the mouth of the Cache River, which are hereby transferred to and placed under the control and jurisdiction of such commission, may, in the discretion of said commission, upon approval by the Chief of Engineers, receive allotments for improvements now under way or hereafter to be undertaken, to be paid for from the amount herein appropriated:

Provided further, That no part of the improvement of the Ohio River, with a view to the construction of locks and dams, shall be considered as transferred to or placed under the control and jurisdiction of the Mississippi River Commission.

The same act provides that—

The jurisdiction of the Mississippi River Commission is hereby extended so as to include that part of the Arkansas River between its mouth and the intersection thereof with the division line between Lincoln and Jefferson Counties; and any funds which are herein or may be hereafter appropriated by Congress for improving the Mississippi River between Head of Passes and the mouth of the Ohio River and which may be allotted to levees and bank revetment may be expended within the limits of said extended jurisdiction, under the direction of the Secretary of War, in accordance with the plans, specifications, and recommendations of the Mississippi River Commission, as approved by the Chief of Engineers, and upon like terms and conditions for levees and bank revetment upon any part of the Mississippi River now under the jurisdiction of said commission, and in such manner as will best promote and accomplish the purposes for which the commission was created, in so far as the territory hereby added to its said jurisdiction may be involved.

The flood-control act, approved March 1, 1917, further provides:

That the watercourses connected with the Mississippi River to such extent as may be necessary to exclude the flood waters from the upper limits of any delta basin, together with the Ohio River from its mouth to the mouth of Cache River, may, in the discretion of said commission, receive allotments for improvements now under way or hereafter to be undertaken.

POLICY ADOPTED BY THE MISSISSIPPI RIVER COMMISSION FOR WORK UNDER THE FLOOD-CONTROL ACT APPROVED MARCH 1, 1917.

The Mississippi River Commission must be governed by and rigidly conform to the terms of the flood-control act, and the hearty cooperation of all levee boards is looked for in order to carry on the work of levee construction in a satisfactory and economical manner.

The money to be appropriated under authority of the flood-control act is "for controlling the floods and for the general improvement of the Mississippi River," etc., and the amounts to be devoted to the construction of levees and other classes of work will, as heretofore, be determined by the Mississippi River Commission from time to time as appropriations are made and in accordance with policy of the commission as heretofore adopted.

Under the law the amount contributed by local interests for the construction or repair of any levee "shall not be less than one-half of such sums as may have been allotted by the commission." The commission will determine in each case what proportion is "just

and equitable" when the allotments of funds of successive appropriations are made. No funds can be expended by the commission under the flood-control act for levee work in any levee district "between the Head of the Passes and Rock Island, Illinois," unless the contribution of funds thereto required by law be first made.

The amounts contributed by local levee boards must be in current funds, deposited in the United States Treasury or acceptable depository to the credit of the Mississippi River Commission. In accordance with a ruling of the Treasury Department, interest accruing, if any, on such deposits may be payable by the depository to the levee boards which have made such deposits in compliance with the law.

The terms of the flood-control act prohibit the expenditure of funds for levee purposes in any levee district unless a minimum of one-third of the amount required is contributed by the said district.

No credit will be given to any levee district for work done or money expended on the construction of levees prior to the allotment of funds therefor by the commission from the appropriations authorized by the flood-control act, and contributions from levee boards required by law must be in current funds.

All levee construction and the disbursement of funds from commission allotments and the contributions from levee districts shall be under the direction of the Mississippi River Commission and its authorized agents.

No money allotted by the commission under authority of the flood-control act can be expended for right of way, but "all such rights of way must be provided free of cost to the United States" by the several levee districts. Furthermore, "no money paid as expenses incurred by any State or levee district in securing such right of way or in any temporary works of emergency, or for the maintenance of any levee line, shall be computed as a part of the contribution of such State or levee district" toward the allotment made by the commission.

The maintenance of a completed levee, constructed in whole or in part under the flood-control act, must be cared for by the levee district protected thereby.

Competent experienced engineers and inspectors in the service of the levee boards may be transferred to the service of the commission under civil-service regulations as the exigencies of the work may require.

Section (b) of the flood-control act provides that contributions from levee districts apply solely to the construction and repair of levees. Revetment work, therefore, is regarded as exempt from the ratio of contribution prescribed by this law.

A resolution passed by the Mississippi River Commission July 12, 1917, requires that each levee district on the Mississippi River under the control of the Mississippi River Commission be advised that the cash contribution for the construction of levees in such district, after an allotment of funds by the Mississippi River Commission under the provisions of the flood-control act approved March 1, 1917, must be made within 90 days after notice of such allotment, except where the commission specially authorizes other action.

APPROPRIATION AND ALLOTMENTS.

Since the creation of the Mississippi River Commission there has been appropriated and allotted for expenditure under it on the Mississippi River \$90,715,610.68. By the river and harbor act approved July 27, 1916, the sum of \$6,000,000 was appropriated for continuing improvement of the Mississippi River from Head of Passes to the mouth of the Ohio River, and for the construction of levees from the mouth of the Ohio River to Rock Island, Ill., including salaries, clerical, office, traveling, and miscellaneous expenses of the Mississippi River Commission. On recommendation of the Mississippi River Commission this was allotted as follows:

SECRETARY.

Mississippi River Commission.....	\$50,000	
Surveys, gauges, and observations.....	60,000	
Dredges and dredging.....	250,000	
Levees—Cape Girardeau to Rock Island:		
Rock Island to New Boston, Ill.....	15,000	
Muscatine to mouth of Iowa River, Iowa.....	30,000	
Oquawka to Dallas, Ill.....	20,000	
Warsaw to Quincy, Ill.....	30,000	
La Grange to mouth of Missouri River, Mo.....	20,000	
Quincy to Hamburg Bay, Ill.....	70,000	
Head Chouteau Island to Prairie du Pont, Ill.....	25,000	
Grand Tower to Gale near Thebes, Ill.....	20,000	
		\$590,000

FIRST AND SECOND DISTRICTS.

Revetment:		
Gayoso, Mo.....	150,000	
Barfield, Ark.....	200,000	
Bullerton, Ark.....	150,000	
Porter Lake, Ark.....	105,000	
Old Town Bend, Ark.....	105,000	
General repairs and stone.....	50,000	
Plant:		
Concrete revetment plant.....	150,000	
Six barges.....	50,000	
St. Louis district revetment plant.....	60,000	
New wood barges and flats.....	37,000	
Care and repair of plant.....	75,000	
Surveys.....	5,000	
Levees:		
Upper St. Francis levee district.....	100,000	
Reelfoot levee district.....	40,000	
Lower St. Francis levee district.....	270,000	
White River levee district.....	100,000	
		\$1,647,000

THIRD DISTRICT.

Revetment:		
Cottonwood, Miss.....	240,000	
Panther Forest, Ark.....	70,000	
Bolivar.....	90,000	
Fittlers.....	9,000	
Red Fork, Ark.....	80,000	
Vicksburg, Miss.....	100,000	
Reid Bedford, La.....	100,000	
Ashbrook Neck, Miss.....	60,000	
General repairs and stone.....	60,000	
Plant:		
New.....	200,000	
Care and repair.....	66,000	

Surveys	\$5, 000
Ashbrook Neck Dike	232, 000
Levees:	
Lower Yazoo levee district	300, 000
Upper Tensas levee district	373, 000
	<hr/> \$1, 985, 000

FOURTH DISTRICT.

Revetment:	
Hard Times Bend	100, 000
Kempe	65, 000
Giles Bend	100, 000
Marengo Bend	100, 000
Grand Bay	175, 000
Bondurant	35, 000
New Orleans	130, 000
General repairs and stone	23, 000
Plant:	
New	100, 000
Care and repair	60, 000
Surveys	5, 000
Levees:	
Lower Tensas levee district	850, 000
Atchafalaya levee district	150, 000
Lafourche levee district	100, 000
Barataria levee district	95, 000
Pontchartrain levee district	125, 000
Lake Borgne levee district	50, 000
Atchafalaya and Red Rivers	15, 000
	<hr/> 1, 778, 000
	<hr/> 6, 000, 000

From unallotted balance from refundments made in 1898 and 1900, an allotment of \$14.02 to the Mississippi River Commission was approved by the Assistant Secretary of War, November 24, 1916.

From the appropriation of \$6,000,000 carried in the sundry civil act of June 12, 1917, for carrying out the provisions of the flood-control act approved March 1, 1917, an allotment of \$5,660,000 was approved by the Secretary of War, June 22, 1917, for the work of the Mississippi River Commission.

The following reallocations of funds from appropriations and allotments, as reported in reports of the Mississippi River Commission for 1915, page 3476, and in this report, have been made during the year:

From allotment for Lower Tensas Levee district to Memphis Harbor ..	\$28, 000
From allotment for Lake Bolivar to repairs to existing works and stone, third district	60, 000
From allotment for Upper Tensas Levee district to lower Yazoo Levee district	49, 000
From allotment for Marengo bend to Giles bend	10, 000
From allotment for Ashbrook neck to Upper Tensas Levee district	20, 000
From allotment for Cottonwood, Miss., to Upper Tensas Levee district ..	20, 000
From allotment for Ashbrook Dike to Upper Tensas Levee district	20, 000
From allotment for Delta, Miss. (maintenance act of 1915), to new plant, first and second districts	15, 000

In addition to the above the sum of \$9,100 was allotted by the Chief of Engineers for the fiscal year ending June 30, 1917, from the permanent indefinite appropriation made by act of August 11, 1888, as amended by act of June 13, 1902, for gauging the waters of the Mississippi River and its tributaries, which is applied to the maintenance of certain river gauges.

Details of the expenditures of the various allotments are appended hereto.

MISSISSIPPI RIVER COMMISSION.

Commissioners.—The commissioners during the fiscal year were Col. C. McD. Townsend, Corps of Engineers, United States Army, president until June 8, 1917; Col. J. G. Warren, Corps of Engineers, United States Army, acting president from June 9, 1917; J. A. Ockerson, civil engineer; Homer P. Ritter, assistant, United States Coast and Geodetic Survey; Charles H. West, civil engineer; Col. Lansing H. Beach, Corps of Engineers, United States Army; and Edward A. Glenn.

Secretary and district officers.—The following officers of the Corps of Engineers, United States Army, were on duty under the commission during the year: Secretary, Maj. Clarke S. Smith; first and second districts officer, Maj. E. M. Markham, until August 12, 1916; Maj. Michael J. McDonough, until April 30, 1917; and Lieut. Col. G. P. Howell, from May 1, 1917; third district officer, Maj. John R. Slattery; fourth district officer, Maj. W. G. Caples, until November 30, 1916; Maj. Richard C. Moore, until April 29, 1917; Capt. Beverly C. Dunn, until May 10, 1917. Lieut. Col. G. McC. Derby, United States Army, retired, was on duty under the commission from May 11, 1917.

Sessions.—Four sessions of the commission were held during the fiscal year. The one hundred and thirty-fifth session, July 6-7, 1916, and the one hundred and thirty-sixth, August 9, 1916, were held in the offices of the commission, International Life Building, St. Louis, Mo. The one hundred and thirty-seventh session, November 9-21, 1916, and the one hundred and thirty-eighth, April 20-28, 1917, were held on board the steamer *Mississippi* during inspections of the river from Rock Island, Ill., to New Orleans, La., and from St. Louis, Mo., to New Orleans, La., respectively. At these sessions public hearings were given to representatives of the navigation, levee, commercial, and other interests of the river.

The following is a summary of the work of the commission:

SURVEYS, GAUGES, AND OBSERVATIONS.

The general survey of the Mississippi River has been completed from the Head of Passes to its headwaters and the maps and charts published. A resurvey of the river from Cairo to the mouth of Red River, a distance of 772 miles, was completed in 1914, the reduction of field notes and mapping has been completed, and a contract has been let for the publication of maps, scale 1 inch=1 mile, and charts, scale 1:20,000, of this survey.

The field work of the survey of the Atchafalaya River from Red River to Morgan City, La., was completed in March, 1917, and the reduction of field notes and mapping are in progress.

Discharge observations of the river and many of its tributaries have been made at high and low water, river and tide gauges maintained, and other physical data collected. (For details see Appendix 1.)

DREDGES AND DREDGING.

For the purpose of maintaining a channel at least 9 feet deep and 250 feet in width at all stages of the river, 10 dredges have been con-

structed. A navigable channel has been maintained since 1895, and a channel of project dimensions has been maintained since 1902, except as follows: For 18 days in 1903 and a few days in 1904, the depths at one bar were 8 and 8½ feet. For a few days there was less than 9 feet at five bars in 1908, seven bars in 1910, five bars in 1914, and two bars in 1916. For a few days at one bar in 1913, and four bars in 1916, the required width was not maintained.

The project depth of 9 feet with width of 250 feet was exceeded at all bars below Cairo at the end of the year.

During the dredging season of 1916, nine dredges were operated to maintain the project channel and harbor depths. A rapid fall in the stage of the river occurred during the latter part of August, and there was no material rise until near the end of December. The minimum stages of the year at Cairo and Memphis were 5.8 feet December 25 and 2.8 feet December 28, respectively. Dredges were in the field from August 9 to December 27. Actual dredging was commenced August 15 and was discontinued December 8. A slight rise at that time was followed by a lower stage accompanied by heavy running ice. When the ice had passed, a rapid rise made further dredging unnecessary.

On account of the formation of a mud bar in Memphis Harbor, temporary dredging necessary to provide access to the harbor was begun in May, 1915. To secure the permanent improvement of the harbor, dredging was begun January 11, 1916, for the excavation of a channel 3,000 feet long to divert water from the Mississippi River through the Loosahatchie and Wolf Rivers along the harbor front. A dam was constructed across the Wolf River Channel to assist in carrying out this plan. Work on the dam was begun in September, 1916, and was practically completed November 30.

Dredging in the channel was continued during the year, and up to November 30, 1916, a total of about 466,000 cubic yards of material had been removed. Access to the harbor was maintained during the year by dredging. (For details, see Appendixes 1 and 2.)

REVTMENT WORK.

There is summarized in the following table the total lengths of the existing revetments and the amounts constructed during the year.

Mississippi River, mouth of the Ohio River to Head of Passes—effective length of bank protection, June, 1917, and length built during the year.

Locality.	Miles below Cairo.	Bank of river.	Built during the year.	Revetment in place.
			<i>Lin. ft.</i>	<i>Lin. ft.</i>
Columbus, Ky.....	21	Left.....		2,200
Richman, Ky.....	36	do.....		1,400
Stough Landing Neck, Tenn.....	60	do.....	764	16,364
New Madrid, Mo.....	71	Right.....		4,460
Gayoso Bend, Mo.....	106	do.....	5,578	5,578
Caruthersville, Mo.....	110	do.....		2,400
Bardsfield, Ark.....	141	do.....	3,475	3,475
Pharm Point Reach:				
Daniels Point, Ark.....	152	do.....		
Ashport, Tenn.....	155-159	Left.....		
Fletcher's Bend, Ark.....	158-161	Right.....		76,080
Osceola, Ark.....	163-165	do.....		
Bullerton Bar, Ark.....	168	do.....	2,960	

Mississippi River, mouth of the Ohio River to Head of Passes, etc.—Continued.

Locality.	Miles below Cairo.	Bank of river.	Built during the year.	Revetment in place.
			<i>Ltn. ft.</i>	<i>Ltn. ft.</i>
Golden Lake, Ark.....	192	Right		3,010
Hopefield Bend, Ark.....	227-230	do		14,800
Memphis, Tenn.....	230-232	Left		14,800
Tennessee Chute, Tenn.....	237	do		1,000
Star Landing, Miss.....	257	do		7,585
Porter Lake, Ark.....	261	Right	582	5,822
Walnut Bend, Ark.....	281	do		7,160
Trotters Landing, Miss.....	304	Left		6,635
Helena, Ark.....	306	Right		5,000
Delta, Miss.....	315	Left	2,168	7,196
Old Town Bend, Ark.....	324	Right		6,000
Sunflower, Miss.....	365	Left		9,670
Red Fork, Ark., Arkansas River.....	402	Right		1,200
Lake Bolivar Front.....	417	Left	1,100	8,640
Ashbrook Neck.....	446	do		11,150
Panther Forest.....	452	Right	1,780	7,400
Leland Neck, Ark.....	471	do		5,000
Greenville, Miss.....	478	Left	1,070	21,670
Vauchuse, Ark.....	487	Right		3,925
Longwood, Miss.....	500	Left		4,200
Grand Lake, Ark.....	510	Right		8,500
Lake Providence Reach:				
Louisiana Bend.....	522	do		11,800
Lake Providence, La.....	540	do		12,000
Fitters Bend, Miss.....	550	Left	1,300	8,450
Cottonwood, Miss.....	556	do	8,060	8,060
Albemarle Bend, Miss.....	558	do		13,730
Delta Point, La.....	568	Right		5,900
Vicksburg, Miss.....	599	Left	1,800	1,800
Reid-Bedford Bend, La.....	608	Right	530	6,810
Hard Times Bend, La.....	633	do		7,689
Bondurant.....	643	do		4,150
Kampe.....	658	do		28,616
Giles Bend.....	687-691	Left	800	20,917
Marengo Bend.....	693	Right		12,844
Natchez Front.....	700	Left		3,586
Grand Bay.....	808	Right	3,180	3,180
Plaquemine, La.....	854	do		6,370
Avondale, La.....	953	do		1,615
New Orleans Harbor.....	960-970			
Carrollton.....		Left		13,680
Greenville.....		Right		13,310
Gretna Front.....		do		5,010
Gouldsboro-Algiers.....		do		9,475
Third district.....		Left		13,700
Total.....			134,644	148,981

1 6.56 miles.

2 91.34 miles.

RIVER STAGES DURING THE YEAR.

The stage of the Mississippi River remained moderately high until the latter part of July. During August a fall of 7 feet at Cairo was followed by a rise which reached 25.4 on that gauge August 20. From September 1 to the end of December a moderately low stage prevailed without much variation. The gauge reading at Cairo was below 14 feet 28 days during September, and below 10 feet 24 days in October, and 23 days in November. A stage of 13.2 at Cairo December 14 was followed by the lowest stage of the year, reading 5.8 at Cairo December 25. A rapid rise began during the last few days of December, and moderately high stages have prevailed since that time. The maximum reading at Cairo during 1917 was 49.95 April 4 and 5. This reading is 4.74 lower than the previous highest, which occurred in 1913. A stage of 32.9 at St. Louis June 14 resulted from moderately high stages on the upper Mississippi combined with flood stages on the Missouri River. (For details see Appendix 1.)

LEVEES.

For convenience in administration and allotment of funds for levee purposes the river front below Cape Girardeau, Mo., has been divided by the commission into levee districts. The names and locations of these districts as now established by the commission are as given on pages 3718-3719 of report of the Chief of Engineers for 1912. Levee construction from Cape Girardeau, Mo., to Rock Island, Ill., as provided for by the river and harbor act approved July 27, 1916, is in charge of the secretary, Mississippi River Commission.

The following table, which is similar to that given in previous reports, has been brought up to date and shows the present condition of levees below Cape Girardeau and levee operations during the past year, as compiled from the reports of the district officers:

Levee district.	In system.	Built.	Contents, 1916.	Built since by United States.	Built since by local authorities.	Total built since 1916.
	<i>Miles.</i>	<i>Miles.</i>	<i>Cubic yds.</i>	<i>Cubic yds.</i>	<i>Cubic yds.</i>	<i>Cubic yds.</i>
Upper St. Francis.....	87	87	5,784,303	84,961	511,539	596,500
Lower St. Francis.....	218	211	40,736,993	860,119	2,263,030	3,123,149
White River.....	74	74	18,275,504	545,978	372,789	918,767
Reelfoot.....	21	21	2,480,249	76,769	156,250	233,019
Upper Yazoo.....	124	124	36,895,009	.....	1,622,783	1,622,783
Lower Yazoo.....	206.30	185.20	51,896,527	1,371,564	1,896,423	2,267,987
Upper Tensas.....	192	190.60	48,726,944	1,070,219	1,527,964	2,598,183
Lower Tensas.....	167.29	150.34	30,094,155	529,076	1,104,690	1,633,776
Atchakalaya.....	127.87	127.87	25,268,582	509,967	1,182,934	1,692,901
Lafourche.....	82.14	82.14	12,020,411	247,017	884,482	1,131,499
Barataria.....	71.12	71.12	4,539,656	137,511	189,281	326,792
Pontchartrain.....	125.33	125.33	21,688,706	461,224	443,361	904,585
Lake Borgne.....	79.29	79.29	5,426,347	101,382	167,752	269,134
Total.....	1,565.34	1,508.89	300,779,286	6,004,787	10,323,287	16,328,074

Levee district.	Lost or abandoned during the year.	Contents, 1917.	Required to complete.	Estimated final contents.	Per cent now built.	Approximate area protected.
	<i>Cubic yds.</i>	<i>Cubic yds.</i>	<i>Cubic yds.</i>	<i>Cubic yds.</i>		<i>Sq. mi.</i>
Upper St. Francis.....	.....	6,381,303	7,913,136	14,294,439	44.6	700
Lower St. Francis.....	.....	43,869,142	8,139,858	52,009,000	84.2	3,500
White River.....	141,608	16,052,663	12,458,337	28,511,000	56.3	910
Reelfoot.....	.....	2,719,368	1,308,632	4,028,000	67.5	310
Upper Yazoo.....	411,400	38,106,392	3,525,608	41,632,000	91.5	3,281
Lower Yazoo.....	833,000	63,271,814	33,773,263	87,044,777	61.2	3,367
Upper Tensas.....	220,000	51,104,427	24,762,817	75,867,244	67.4	2,600
Lower Tensas.....	775,967	30,951,973	15,601,721	46,553,694	66.5	2,080
Atchakalaya.....	214,800	25,746,688	14,879,733	40,626,416	63.4	6,986
Lafourche.....	517,071	12,634,839	4,628,217	17,263,056	73.2	2,020
Barataria.....	74,015	4,792,433	968,265	5,760,698	83.2	.....
Pontchartrain.....	167,785	22,425,506	10,151,822	32,577,328	68.8	.....
Lake Borgne.....	95,309	5,600,172	792,564	6,392,756	87.6	1,816
Total.....	3,450,945	313,656,415	138,903,993	452,560,408	69.3	26,569

¹ 263,387 cubic yards of sublevees not included.

² Does not include 26,000 cubic yards in a drainage ditch.

³ Does not include 38,700 cubic yards placed in new levee at Bella Vista by the local authorities.

⁴ Does not include 68,700 cubic yards placed in the new Sarpy Levee, as the old levee is still the controlling levee line.

The column "Estimated final contents" of the levees given above is based on grades as revised on April 19, 1914, and sections provisionally established by the commission.

No levee work has been done in the Homochitto levee district by the United States, except closing crevasses in levees already existing

as provided for by joint resolution of Congress approved April 30, 1912.

The \$200,000 appropriated for examination and for levee construction from Cape Girardeau, Mo., to Rock Island, Ill., has been placed under contract and about 90 per cent of the work completed. For additional work in this district, \$280,000 was allotted from funds provided by the river and harbor act of July 27, 1916. Work has been contracted for in three districts aggregating \$47,080, and is about 15 per cent completed.

Two types of levee machine have been constructed by the commission, and are in successful operation, one of the cableway type in the third district and three of the derrick type in the fourth. In addition, several contractors have installed similar machines, and the lower prices which have been recently received for levee construction may in part be ascribed to the competition caused thereby. As a result of this development of a suitable machine for levee construction, the amount of levee work that can be done annually is practically limited only by the amount of funds available therefor. (For details, see Appendixes 2, 3, and 4.)

The expenditures for high-water protection were exceptionally light, which is due to the fact that the levees are nearer to a stage of completion than during former floods. A total of \$27,750.98 was, however, expended by the United States for high-water protection of levees during the flood of 1917. The amounts expended by local authorities have not yet been reported to the commission.

The total area overflowed was 1,734 square miles, all of which was due to backwater. This includes 19 square miles overflowed by crevasses in Laconia Circle Levee.

Further details as to the condition of levees and effect of flood are given in the following table:

Effect of flood of 1917 on levee system, etc.

Levee district.	Area of land overflowed.	Area of land saved from overflow by levees.	Cost of high-water protection to the United States.	Length of levees below commission grade.
	Sq. mi.	Sq. mi.		Miles.
Upper St. Francis.....	202	498	.....	52.0
Lower St. Francis.....	100	3,400	.....	91.0
White River.....	252	668	.....	57.0
Reelfoot.....		310	.....	17.0
Upper Yazoo.....		3,281	.....	33.0
Upper Tensas.....	372	2,628	\$12,737.25	179.8
Lower Yazoo.....	806	2,559	12,737.25	170.6
Lower Tensas.....		2,080	2,276.48	135.79
Atchafalaya.....		6,086	.....	120.61
Lafourche.....		2,020	.....	71.93
Barataria.....		.....	.....	40.62
Lake Borgne.....		1,816	.....	35.89
Pontchartrain.....		.....	.....	117.77
Total.....	1,734	25,335	27,750.98	1,123.01

¹ Includes 19 square miles in Laconia Circle overflowed by crevasses of 1916.

More substantial construction and more rigid supervision of the Arkansas River levees must be secured, and the Red Fork Levee must be connected with the main controlling levee above Arkansas City before satisfactory flood protection for the Tensas Basin can be realized.

CONDITION OF CHANNEL AT END OF FISCAL YEAR.

With the exception of rare periods of brief duration, there is now in the Mississippi River a good navigable channel at all stages of river, with a depth of 9 feet or more and a width of at least 250 feet for a distance of 833 miles below Cairo, and a depth of not less than 30 feet, with a width of several hundred feet at all times for the remaining 227 miles to the Head of Passes. There is an ample navigable channel at least 14 feet in depth from Cairo to the Gulf of Mexico during five to eight months of each year when high stages of river prevail.

The following are depths and widths for the different stretches of the river below Cairo that can usually be relied upon during the lowest stages of the year:

Cairo to Memphis, Tenn., 230 miles, least depth 9 feet for width of 250 feet. Low-water channel maintained by dredging.

Memphis to Vicksburg, Miss., 370 miles, least depth 9 feet for width of 250 feet. Low-water channel maintained by limited amount of dredging.

Vicksburg to Baton Rouge, La., 233 miles, least depth 11 feet for width of 250 feet or more. Low-water channel maintained by a limited amount of dredging at rare intervals.

Baton Rouge to New Orleans, La., 134 miles, least depth 35 feet for width of several hundred feet. No dredging.

New Orleans to Quarantine Station, La., 92 miles, least depth 62 feet for width of several hundred feet. No dredging.

At mean low water there is an available depth of 31½ feet to the Gulf through South Pass and 24 feet through Southwest Pass, as reported by the district engineer officer, New Orleans, La.

RECOMMENDED APPROPRIATIONS AND ESTIMATE OF FUNDS REQUIRED.

The views of the commission as to the funds needed for the successful prosecution of the adopted project of improvement were set forth in its annual report for 1914.

Amount that can be profitably expended in the fiscal year ending June 30, 1919, exclusive of the balance unexpended July 1, 1918.

For continuing the general improvement of the Mississippi River from the Head of Passes to the mouth of the Ohio River, for the building of levees from the Head of Passes to Rock Island, Ill., and for surveys, including salaries, clerical, office, traveling, and miscellaneous expenses of the Mississippi River Commission, \$12,000,000.

WM. H. BIXBY,
Brigadier General, United States Army, Retired,
President Mississippi River Commission.

J. A. OCKERSON,
Civil Engineer.

HOMER P. RITTER,
Assistant, United States Coast and Geodetic Survey.

J. G. WARREN,
Colonel, Corps of Engineers, United States Army.

C. H. WEST,
Civil Engineer.

LANSING H. BEACH,
Colonel, Corps of Engineers, United States Army.

EDWARD A. GLENN.

Money statements.

APPROPRIATIONS EXPENDED UNDER MISSISSIPPI RIVER COMMISSION.

Appropriation for improving Mississippi River.

July 1, 1916, balance unexpended.....	\$146, 910. 92 ¹
Amount appropriated by River and Harbor Act July 27, 1916....	6, 000, 000. 00
Miscellaneous receipts from sales of Engineer property, rentals, depreciation of plant used at South Pass, Mississippi River...	30, 879. 32
	<hr/>
June 30, 1917, amount expended during fiscal year.....	6, 177, 790. 24
	<hr/>
July 1, 1917, balance unexpended.....	8, 518, 008. 72
July 1, 1917, outstanding liabilities.....	\$483, 015. 84
July 1, 1917, amount covered by uncompleted contracts.....	1, 243, 122. 26
	<hr/>
	1, 726, 138. 10
	<hr/>
July 1, 1917, balance available.....	1, 791, 865. 62
	<hr/>
Distributed as follows:	
Mississippi River Commission.....	\$18, 571. 99
Surveys, gages and observations.....	18, 730. 95
Levees, Cape Girardeau, Mo., to Rock Island, Ill.....	207, 460. 57
Levees, Head of the Passes to Cape Girardeau, Mo.....	540, 369. 33
Revetment and contraction works, permanent channel improve- ment and protection.....	658, 508. 09
Dredges and dredging.....	64, 350. 21
Plant and miscellaneous.....	170, 175. 61
Improving harbors and tributaries except Vicksburg harbor.....	103, 253. 83
Improving Vicksburg Harbor.....	20, 445. 04
	<hr/>
	1, 791, 865. 02

AMOUNT THAT CAN BE PROFITABLY EXPENDED IN FISCAL YEAR ENDING JUNE 30, 1919.

For continuing the general improvement of the Mississippi River from the Head of the Passes to the mouth of the Ohio River, for the building of levees from the Head of the Passes to Rock Island, Ill., and for surveys, including salaries, clerical, office, traveling and miscellaneous expenses of the Mississippi River Commission.....	\$12, 000, 000. 00
--	--------------------

¹ The amount, \$127,075.82, reported in annual report for 1916, has been increased \$19,835.60 by the fourth district officer by transfer from allotment for "Ashbrook Dike," third district, act of Mar. 4, 1915, credited to allotment for "Atchafalaya levee district," fourth district, Improving Mississippi River (ED 71814-248).

APPROPRIATION FOR MAINTENANCE AND IMPROVEMENT OF EXISTING RIVER AND HARBOR WORKS.

July 1, 1916, balance unexpended—

Under act of Oct. 2, 1914.....¹\$580,913.22Under act of Mar. 4, 1915.....²2,009,061.31

\$2,589,974.53

¹The amount, \$580,910.47, reported in annual report for 1916, has been increased \$2.75 by refundments, as follows:

By the secretary—

October, 1916, vouchers 119, 188, 189, 190, and 191, in January, 1916, \$0.15, \$0.35, \$0.35, \$0.20, respectively (to surveys, gages, and observations).....\$1.25

October, 1916, voucher 66, January, 1916 (to dredges and dredging)......10

February, 1917, voucher 66, January, 1916, \$0.15, and February, 1917, voucher 208, April, 1916, \$0.25 (to dredges and dredging)......40

By the third district officer—

August, 1916, vouchers 14, 138, and 140, January, 1916, and voucher 164, May, 1916 (to Lower Yazoo levee district).....1.00

2.75

²The amount, \$2,027,688.08, reported in annual report for 1916, has been decreased \$14,576.77, as follows:

Increased by refundments—

By the secretary—

August, 1916, voucher 9, December, 1915 (to Mississippi River Commission).....\$0.75

October, 1916, vouchers 63 and 64, March, 1916, \$0.40 and \$0.25, respectively (to Mississippi River Commission)......65

October, 1916, vouchers 24, 25, 28, 54, 94, and 96, March, 1916, \$0.10, \$0.10, \$0.80, \$0.25, \$0.10, and \$0.10, respectively (to surveys, gages, and observations)......95

February, 1917, vouchers 60, 61, and 62, March, 1916, \$0.15 each, respectively, and voucher 31, April, 1916, \$0.25 (to surveys, gages, and observations)......70

October, 1916, voucher 65, March, 1916 (to dredges and dredging)......15

By the first and second districts officer—

August, 1916, voucher 72, May, 1916 (to Lower St. Francis levee district)......20

July, 1916, voucher 27, March, 1916 (to White River levee district)......45

August, 1916, vouchers 99 and 100, May, 1916 (to Delta, Miss.)......40

July, 1916, voucher 100, January, 1916 (to plant)......24

By the third district officer—

August, 1916, vouchers 14, 138, and 140, January, 1916, and voucher 164, May, 1916 (to Panther Forest, Ark.)......20

August, 1916, vouchers 14, 138, and 140, January, 1916, and voucher 164, May, 1916 (to Greenville, Miss.).....1.00

August, 1916, vouchers 14, 138, and 140, January, 1916, and voucher 164, May, 1916 (to Grand Lake, Ark.).....1.48

August, 1916, vouchers 14, 138, and 140, January, 1916, and voucher 164, May, 1916 (to plant)......50

By the fourth district officer: August, 1916, voucher 47, January, 1916 (to Barataria levee district).....2.33

\$10.00

Increased by transfer from allotment for "Delta, Miss.," first and second districts, credited to allotment for "New Plant," first and second districts, act of Mar. 4, 1915 (ED 15927-510).....15,000.00

Increased by transfer from allotment for "Delta, Miss.," first and second districts, credited to allotment for "Memphis Harbor," first and second districts, act of Mar. 4, 1915 (ED 15927-620).....25,000.00

Increased by reimbursement from Fifth Louisiana levee district for cutting drainage ditch, credited to allotment for "Lower Tensas levee district," fourth district (ED 100210-225).....1,109.20

Increased by reimbursement from allotment for South Pass Channel, Mississippi River, appropriation for maintenance and improvement of existing river and harbor works credited to allotment for "Harbor at New Orleans, La.," fourth district (ED 30157-275).....139.63

41,258.83

Decreased by transfer from allotment for "Delta, Miss.," first and second districts, credited to allotments for "New Plant," \$15,000 and "Memphis Harbor," \$25,000, first and second districts, act of Mar. 4, 1915.....40,000.00

Decreased by transfer from allotment for "Ashbrook Dike," third district, act of Mar. 4, 1915, credited to allotment for "Atchafalaya levee district," fourth district, Improving Mississippi River (ED 71814-248).....19,835.60

18,576.77

³The amount, \$2,608,548.55, reported in annual report for 1916, has been decreased \$18,576.77 by refundments, etc., as shown in footnotes ¹ and ² above.

3426 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1917.

Miscellaneous receipts from sales of Engineer property, etc.:

Under act of Oct. 2, 1914-----	\$0. 00	
Under act of Mar. 4, 1915-----	19, 812. 67	\$19, 812. 67
		<hr/> 2, 608, 787. 20
June 30, 1917, amount expended during fiscal year:		
Under act of Oct. 2, 1914-----	228, 190. 53	
Under act of Mar. 4, 1915-----	1, 554, 396. 40	1, 820, 526. 93
July 1, 1917, balance unexpended:		
Under act of Oct. 2, 1914-----	314, 722. 09	
Under act of Mar. 4, 1915-----	474, 537. 58	789, 260. 27
July 1, 1917, outstanding liabilities:		
Under act of Oct. 2, 1914-----	\$15, 098. 53	
Under act of Mar. 4, 1915-----	111, 447. 62	
	126, 541. 15	
July 1, 1917, amount covered by uncompleted contracts:		
Under act of Oct. 2, 1914-----	42, 260. 83	
Under act of Mar. 4, 1915-----	219, 648. 19	261, 909. 02
		<hr/> 388, 450. 17
July 1, 1917, balance available:		
Under act of Oct. 2, 1914-----	188, 181. 54	
Under act of Mar. 4, 1915-----	212, 628. 56	400, 810. 10
Distributed as follows:		
Mississippi River Commission-----	248. 71	
Surveys, gauges, and observations-----	22, 292. 50	
Levees, Head of the Passes to Cape Girardeau, Mo-----	212, 931. 50	
Revetment and contraction works, permanent channel improvement and protection-----	31, 997. 30	
Dredges and dredging-----	94, 337. 85	
Improving harbors and tributaries except Vicksburg harbor-----	39, 002. 24	400, 810. 10

APPROPRIATION FOR GAUGING WATERS OF THE MISSISSIPPI RIVER AND ITS TRIBUTARIES.¹

July 1, 1916, balance unexpended-----	\$1, 631. 70
Amount allotted by Chief of Engineers, from permanent annual appropriation made by section 6 of river and harbor act of Aug. 11, 1888, as amended by section 9 of river and harbor act of June 13, 1902-----	9, 100. 00
	<hr/> 10, 731. 70
June 30, 1917, amount expended during fiscal year-----	\$8, 313. 92
June 30, 1917, amount reverted to Treasury during fiscal year-----	646. 09
	<hr/> 8, 960. 01

¹ The custody and care of the gauges maintained under this appropriation were assumed by the Mississippi River Commission Feb. 11, 1901, on which date they were transferred to the secretary, under authority of Secretary of War, dated Jan. 25, 1901.

² The amount, \$1,630.85, reported in annual report for 1916, has been increased \$1.05 by the Secretary, by refundments for overpayments, as follows:

October, 1916, voucher 124, March, 1916 (reverted to Treasury)-----	\$0. 40
February, 1917, voucher 32, April, 1916 (reverted to Treasury)-----	. 65

MISSISSIPPI RIVER COMMISSION.

3427

July 1, 1917, balance unexpended.....	\$1, 771. 00
July 1, 1917, outstanding liabilities.....	906. 50
July 1, 1917, balance available.....	865. 10
Amount that can be profitably expended in fiscal year ending June 30, 1919.....	9, 100. 00

ITEMIZED STATEMENT OF EXPENDITURES DURING THE FISCAL YEAR ENDING JUNE 30, 1917, SUBMITTED IN COMPLIANCE WITH REQUIREMENT OF SECTION 6 OF RIVER AND HARBOR ACT OF AUG. 11, 1888.

Observations: Pay of permanent gauge observers.....	\$3, 568. 50
Inspections and repairs:	
Inspection of gauges on Mississippi River by junior engineers and parties on steamers.....	\$1, 602. 16
Inspection of gauges on tributaries.....	205. 19
Renewals and repairs of gauges and bulletins.....	161. 96
	1, 969. 31
Office expenses and contingencies:	
Pay of assistant and junior engineers, surveyors, and clerks.....	2, 214. 12
Stationery, printing, office rent, etc.....	561. 99
	2, 776. 11
Total	8, 313. 92

APPROPRIATION FOR FLOOD CONTROL, MISSISSIPPI RIVER, AND SACRAMENTO RIVER, CAL., 1918.

Allocation, June 20, 1917, from appropriation by sundry civil act of June 12, 1917.....	\$5, 660, 000. 00
July 1, 1917, balance unexpended.....	5, 660, 000. 00

APPROPRIATION FOR IMPROVING YAZOO RIVER AND TRIBUTARIES, MISS.

July 1, 1916, balance unexpended.....	\$14, 722. 52
June 30, 1917, expended in fiscal year.....	14, 722. 52

CONTRIBUTED FUNDS.

For improvement of Mississippi River in upper St. Francis levee district.....	\$234, 000. 00
June 30, 1917, expended in fiscal year.....	\$26, 734. 69
July 1, 1917, amount covered by uncompleted contracts.....	207, 265. 31
	234, 000. 00
For improvement of Mississippi River at Gayoso Bend, Mo.....	150, 000. 00
June 30, 1917, expended in fiscal year.....	150, 000. 00
For improvement of Mississippi River in the Reelfoot levee district (Kentucky)	25, 000. 00
June 30, 1917, expended in fiscal year.....	25, 000. 00

CONSOLIDATED STATEMENT OF ALL APPROPRIATIONS EXPENDED UNDER THE MISSISSIPPI RIVER COMMISSION TO JUNE 30, 1917.

APPROPRIATION FOR IMPROVING MISSISSIPPI RIVER.

Act of June 28, 1879 (organic).....	\$175, 000. 00
Act of June 16, 1880 (sundry civil).....	150, 000. 00
Act of Mar. 3, 1881 (river and harbor).....	1, 000, 000. 00

¹ The amount, \$14,722.52, unexpended, reported in annual report 1916, transferred Oct. 2, 1916, to district engineer officer, Vicksburg, Miss., district, under provision of river and harbor act July 27, 1916. (ED 7716-88.)

² The amount, \$200,000, reported in annual report for 1916, has been increased by additional deposits of \$34,000.

3428 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1917.

Act of Mar. 3, 1881 (sundry civil)	\$150,000.00
Act of Aug. 2, 1882 (river and harbor)	4,123,000.00
Act of Aug. 7, 1882 (sundry civil)	150,000.00
Act of Mar. 3, 1883 (sundry civil)	150,000.00
Act of Jan. 19, 1884	1,000,000.00
Act of July 5, 1884 (river and harbor)	75,000.00
Act of July 5, 1884 (river and harbor), less \$5,000 transferred to snag-boat service	2,065,000.00
Act of July 7, 1884 (sundry civil)	75,000.00
Act of Aug. 5, 1886 (river and harbor), less \$5,942.60 for expenses, office, Chief of Engineers	1,994,057.40
Act of Aug. 5, 1886 (river and harbor), less \$47.30 for expenses, office, Chief of Engineers	29,952.70
Act of Aug. 11, 1888 (river and harbor), less \$4,859 for expenses, office, Chief of Engineers	2,840,141.00
Act of Aug. 11, 1888 (river and harbor)	75,000.00
Act of Oct. 2, 1888 (sundry civil)	35,000.00
Act of Oct. 19, 1888 (deficiency), less \$4,214.39 reverted to the Treasury	20,785.61
Act of Sept. 19, 1890 (river and harbor)	3,200,000.00
Act of Sept. 30, 1890 (deficiency)	5,625.00
Act of Mar. 3, 1891 (deficiency)	1,950.00
Joint resolution approved Mar. 3, 1891 (Public, No. 19)	1,000,000.00
Act of July 13, 1892 (river and harbor)	2,470,000.00
Act of July 28, 1892 (deficiency)	44.80
Act of Mar. 3, 1893 (sundry civil)	2,665,000.00
Act of Aug. 18, 1894 (river and harbor)	485,000.00
Act of Aug. 18, 1894 (sundry civil)	2,665,000.00
Act of Mar. 2, 1895 (sundry civil)	2,665,000.00
Act of June 3, 1896 (river and harbor)	909,000.00
Joint resolution approved Mar. 31, 1897 (Public, No. 6)	250,000.00
Act of June 4, 1897 (sundry civil)	2,933,333.00
Act of July 19, 1897 (deficiency)	625,000.00
Act of July 1, 1898 (sundry civil)	1,983,333.00
Act of Mar. 3, 1899 (sundry civil)	2,583,333.00
Act of Mar. 3, 1899 (river and harbor)	185,000.00
Act of June 6, 1900 (sundry civil), less \$5,000 for expenses, office Chief of Engineers	2,245,000.00
Act of June 13, 1902 (river and harbor)	2,200,000.00
Act of Mar. 3, 1903 (sundry civil)	2,000,000.00
Act of Apr. 28, 1904 (sundry civil)	2,000,000.00
Act of Mar. 3, 1905 (river and harbor)	1,000,000.00
Act of Mar. 3, 1905 (sundry civil)	2,000,000.00
Act of June 30, 1906 (sundry civil)	2,000,000.00
Act of Mar. 2, 1907 (river and harbor)	3,000,000.00
Act of May 27, 1908 (sundry civil)	2,000,000.00
Act of Mar. 4, 1909 (sundry civil)	2,000,000.00
Act of June 25, 1910 (sundry civil)	2,000,000.00
Act of June 25, 1910 (river and harbor)	2,000,000.00
Act of Feb. 27, 1911 (river and harbor)	3,000,000.00
Act of July 25, 1912 (river and harbor), less \$1,443,944.83 expended for rebuilding levees, under joint resolution of Apr. 30, 1912	4,556,055.17
Act of July 25, 1912 (river and harbor)	30,000.00
Act of Mar. 4, 1913 (river and harbor)	6,000,000.00
Act of Mar. 4, 1913 (river and harbor)	200,000.00
Act of July 27, 1916 (river and harbor)	6,000,000.00
Total specific appropriations	82,965,610.68
Balances from former appropriations applied to works below Cairo under act of Aug. 2, 1882, less \$123.42 reverted to Treasury	\$272,504.96
Same for works above Cairo, under act of July 5, 1884	22,632.53
Total balances	295,137.49

Amount, \$15.76, arising from refundments pertaining to extinct or unknown allotments, less debit of Treasury settlement No. 13704, Dec. 28, 1900, as reported by the Chief of Engineers, U. S. Army, June 23, 1916, and credited to allotment for "Mississippi River Commission," December, 1916-----

\$14.02

Miscellaneous receipts:

Previously reported----- \$108,255.13

Amounts received from sales of Engineer property and stores, under the provisions of section 5 of river and harbor act of June 13, 1902, and sales of contact prints:

By the secretary—

From sale of Engineer property in March, 1917, credited to allotment for "Dredges and dredging"----- 1,000.50

By first and second districts officer—

From sales of blue prints, credited to allotment for "Surveys," in months named—

September, 1916----- 3.82
December, 1916----- .50

From sale of Engineer property in August, 1917, credited to allotment for "Plant"----- 380.50

By third district officer—

From sales of Engineer property, credited to allotment for "Plant," in months named—

May, 1917----- 37.12
June, 1917----- 90.00

From sales of contact prints, credited to allotment for "Upper Tensas levee district," in months named—

December, 1916----- .30
February, 1917----- .45

By fourth district officer—

From sales of blue prints, credited in June, 1917, to allotments named—

"Surveys, gages, and observations"----- 6.10
"Lower Tensas levee district"----- 2.50
"Atchafalaya levee district"----- 1.25
"Harbor at New Orleans, La."----- .48

Amount received in November, 1916, from sale of steamer Wynoka (ED. 87050-421 Sec. MRC 2284-10) credited to "Dredges and dredging." Secretary's office----- 20,000.00

Amount received in September, 1916, from rental of tug *White Water*, credited to allotment for "Cottonwood, Miss." third district----- 10.00

Amount received in December, 1916, for depreciation of plant employed on works at Head of Passes, from allotment for South Pass Channel, Mississippi River (Appropriation for Maintenance and Improvement of Existing River and Harbor Works ED. 30157-275 and 104191-18) credited in March, 1917, to "Plant," fourth district----- 2,284.42

Amounts received for depreciation of plant employed at Head of Passes, Mississippi River (ED. 30157-275) credited to allotments indicated in months named:

April, 1917, to "Plant," fourth district----- 3,421.06
May, 1917, to "Plant," fourth district----- 323.52
May, 1917, to "Harbor at New Orleans, La."----- 3,316.80

3430 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1917.

Miscellaneous receipts—Continued.

Amount received in February, 1917, for construction of steel barge, third district, allotment for "Ashbrook Dike," act of Mar. 4, 1915, credited to allotment for "Atchafalaya levee district," fourth district (ED. 71814-248)----- \$21, 075. 90

Total miscellaneous receipts----- \$160, 210. 35

Total----- 83, 420, 972. 54

Expended.

Location and object.	To June 30, 1916.	During year ending June 30, 1917.	Total.
Mississippi River Commission.....	\$1, 046, 872. 26	\$34, 379. 21	\$1, 081, 751. 47
Surveys, gauges, and observations.....	3, 027, 742. 29	53, 853. 53	3, 081, 595. 82
Examination from Cape Girardeau, Mo., to Rock Island, Ill.....	8, 621. 54	1, 378. 46	10, 000. 00
Levees, Cape Girardeau, Mo., to Rock Island, Ill.....	146, 926. 53	11, 764. 14	158, 690. 67
Levees, Head of the Passes to Cape Girardeau, Mo.....	32, 343. 796. 42	545, 206. 01	32, 889, 002. 43
Revetment and contraction works, permanent channel improvement and protection.....	17, 148, 622. 02	1, 247, 368. 57	18, 395, 990. 59
Dredges and dredging.....	6, 779, 680. 71	110, 290. 09	6, 889, 970. 80
Experimental dikes.....	100, 000. 00	.....	100, 000. 00
Plant and miscellaneous.....	5, 935, 066. 94	523, 120. 96	6, 458, 187. 80
Improving harbors and tributaries, except Vicksburg Harbor.....	9, 356, 240. 08	61, 966. 29	9, 417, 206. 37
Improving Vicksburg Harbor.....	582, 980. 96	69, 950. 36	652, 940. 34
Examination and survey of lands subject to overflow, east bank, Mississippi River.....	22, 401. 94	.....	22, 401. 94
Works above Cairo.....	737, 632. 53	.....	737, 632. 53
Total expended.....	77, 235, 584. 24	.....	79, 995, 370. 76
To surplus fund.....	.....	.....	7, 598. 06
Balance unexpended June 30, 1917.....	.....	2, 659, 786. 52	3, 518, 003. 72
Total appropriated, etc.....	.....	.....	3, 420, 972. 54

¹ The amount, \$32,342,556.12, reported in Annual Report for 1916, has been increased \$1,240.30, expenditures for construction of steel barge transferred from third district, allotment for "Ashbrook Dike." (ED. 71814-248.)

² Unexpended balance of the specific appropriation by act of July 25, 1912, for examination and survey of lands subject to overflow, east bank, Mississippi River, carried to surplus fund June 30, 1914. (ED. 15927-414, Sec. M.R.C. 2000-1.)

APPROPRIATION FOR MAINTENANCE AND IMPROVEMENT OF EXISTING RIVER AND HARBOR WORKS.

Act of Oct. 2, 1914 (allotment Oct. 7, 1914)----- \$3, 750, 000. 00
Act of Mar. 4, 1915 (allotment Apr. 2, 1915)----- 4, 000, 000. 00

Total specific appropriations----- 7, 750, 000. 00

Miscellaneous receipts:

Previously reported----- \$12, 666. 41

Amount received in Sept., 1916, from sale of sacks, credited to third district allotments as follows:

"Upper Tensas levee district"----- 6, 300. 00

"Lower Yazoo levee district"----- 6, 300. 00

Amount received in July, 1916, from sale of unused sacks, credited to allotment for "Lower Tensas levee district," fourth district----- 260. 00

Amount received from depreciation of plant employed on works at Head of Passes, from allotment for South Pass Channel, Mississippi River (appropriation for maintenance and improvement of existing river and harbor works) credited to allotment for "Harbor at New Orleans, La." fourth district, in months named—

September, 1916----- 846. 21

March, 1917----- 1, 545. 15

Miscellaneous receipts—Continued.

Amount received in October, 1916, from sale of lumber credited to allotment for "Pontchartrain levee district," fourth district-----	\$10.00
Amounts received from sales of Engineer property under provisions of section 5 of river and harbor act of June 13, 1902, and sales of contact prints—	
By the secretary—	
From sale of blue prints in December, 1916, credited to allotment for "Surveys, gauges, and observations"-----	.79
By first and second district officers—	
From sale of blue prints in October, 1916, credited to allotment "White River levee district"-----	.45
By third district officer—	
From sales of Engineer property credited to allotment for "Plant" in months named—	
July, 1916-----	2,115.25
August, 1916-----	10.00
From sale of contact print in July, 1916, credited to allotment for "Plant"---	.30
By fourth district officer—	
From sale of Engineer property in July, 1916, credited to allotment for "Plant," fourth district-----	2,378.69
From sales of blue prints credited to allotments indicated in months named—	
September, 1916, "Surveys"-----	12.50
September, 1916, "Lafourche levee district"-----	9.83
September, 1916, "Pontchartrain levee district"-----	.25
November, 1916, "Surveys"-----	6.75
November, 1916, "Atchafalaya levee district"-----	12.00
November, 1916, "Lafourche levee district"-----	1.25
November, 1916, "Pontchartrain levee district"-----	3.25
Total miscellaneous receipts---	32,479.08
Amount transferred in January, 1917, for construction of steel barge, third district allotment for "Ashbrook Dike," act of Mar. 4, 1915, credited to allotment for "Atchafalaya levee district," fourth district. (ED 71814-248)-----	21,075.90
	<hr/>
	\$11,408.18
Total-----	<hr/>
	7,761,408.18

3432 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1917.

Expended.

Location and object.	To June 30, 1916.	During year ending June 30, 1917.	Total.
Mississippi River Commission.....	\$ 361,960.33	\$ 7,790.96	\$69,751.29
Surveys, gauges, and observations.....	100,042.71	21,697.38	121,740.09
Levees, Head of Passes to Cape Girardeau, Mo.....	2,265,112.07	842,195.41	3,107,307.48
Revetment and contraction works, permanent channel improvement and protection.....	1,568,594.87	588,634.84	2,157,229.71
Dredges and dredging.....	383,960.74	221,701.41	605,662.15
Plant and miscellaneous.....	503,244.25	82,865.32	586,109.57
Improving harbors and tributaries, except Vicksburg Harbor.....	236,382.12	85,289.77	321,671.89
Experimental revetment.....	32,318.89	351.84	32,670.73
Total expended.....	5,151,615.98	1,820,526.93	6,972,142.91
Balance unexpended June 30, 1917.....			789,280.27
Total appropriated, etc.....			7,761,403.18

¹ The amount, \$61,961.73, reported in annual report for 1916, has been decreased \$1.40, by refundments of overpayments by the secretary, as follows:

August, 1916, on voucher 9, December, 1915, \$0.40; October, 1916, on voucher 63, March, 1916, \$0.40, and on voucher 64, March, 1916, \$0.25 (to Mississippi River Commission).

² The amount, \$100,045.61, reported in annual report for 1916, has been decreased \$2.90, by refundments of overpayments by the secretary, as follows:

October, 1916, on vouchers 119, 188, 189, 190, and 191, in January, 1916, \$0.15, \$0.35, \$0.35, \$0.20, and \$0.20, respectively; October, 1916, on vouchers 24, 25, 28, 54, 94, and 96 in March, 1916, \$0.10, \$0.10, \$0.30, \$0.25, \$0.10, and \$0.10, respectively; February, 1917, on vouchers 60, 61, and 62 in March, 1916, \$0.15 each, respectively; on voucher 31 in April, 1916, \$0.25 (to surveys, gages, and observations).

³ The amount, \$2,265,225.25, reported in annual report for 1916, has been decreased \$1,113.18, by refundments of overpayments and reimbursements, as follows:

By the first and second districts officer—

August, 1916, vouchers 14, 138, and 140, January, 1916, and voucher 164, May, 1916 (to Lower Yazoo levee district)..... \$1.00

August, 1916, voucher 72, May, 1916 (to Lower St. Francis levee district)..... .20

July, 1916, voucher 27, March, 1916 (to White River levee district)..... .45

By the fourth district officer—

September, 1916, reimbursement from Fifth Louisiana levee district for cutting drainage ditch (E. D. 100210-225) (to Lower Tensas levee district)..... 1,109.20

August, 1916, voucher 47, January, 1916 (to Barataria levee district)..... 2.33

⁴ The amount, \$1,569,838.25, reported in annual report for 1916, has been decreased \$1,243.38, by refundments of overpayments and transfer, as follows:

By the first and second districts officer—

August, 1916, vouchers 99 and 100, May, 1916 (to Delta, Miss.)..... \$0.40

By the third district officer—

August, 1916, \$2.68, vouchers 14, 138, and 140 in January, 1916, and voucher 164 in May, 1916—

To Panther Forest, Ark..... .20

To Greenville, Miss..... 1.00

To Grand Lake, Ark..... 1.48

By transfer in January, 1917, for construction of steel barge, third district allotment for "Ashbrook Dike," act of Mar. 4, 1915, credited to allotment for Atchafalaya levee district, fourth district (E. D. 71814-248)..... 1,240.30

⁵ The amount, \$383,961.39, reported in annual report for 1916, has been decreased \$0.65 by refundments of overpayments by the secretary, as follows:

October, 1916, voucher 66, January, 1916, \$0.10, February, 1916, voucher 66, January, 1916, \$0.15, February, 1916, voucher 208, April, 1916, \$0.25, October, 1916, voucher 65, March, 1916, \$0.15 (to dredges and dredging).

⁶ The amount, \$503,244.99, reported in annual report for 1916, has been decreased \$0.74, by refundments of overpayments, as follows:

By the first and second districts officer—

August, 1916, voucher 100, January, 1916 (to plant)..... \$0.24

By the third district officer—

August, 1916, voucher 14, 138, and 140, January, 1916, and voucher 164, May, 1916 (to plant)..... .50

⁷ The amount, \$236,321.75, reported in annual report for 1916, has been decreased \$139.63 by the fourth district officer, reimbursement from appropriation for maintenance and improvement of existing river and harbor works, allotment for South Pass Channel, Mississippi River (E. D. 30157-275).

APPROPRIATION FOR GAGING WATERS OF THE MISSISSIPPI RIVER AND ITS TRIBUTARIES.

Allotments from general appropriations for examinations, surveys, and contingencies of rivers and harbors by acts of—

Mar. 3, 1871 (allotment Apr. 11, 1871)..... \$5,000.00

June 10, 1872 (allotment July 11, 1872)..... 5,000.00

Mar. 3, 1873 (allotment May 17, 1873)..... 5,000.00

June 23, 1874 (allotment July 29, 1874)..... 5,000.00

Mar. 3, 1875 (allotment Mar. 22, 1875)..... 5,000.00

Specific appropriations by river and harbor acts of—

Aug. 14, 1876..... 5,000.00

June 18, 1878..... 5,000.00

Mar. 3, 1879..... 5,000.00

Specific appropriations by river and harbor acts of—Continued.

June 14, 1880	\$5,000.00
Mar. 3, 1881	5,000.00
Aug. 2, 1882	5,000.00
Deficiency act of Mar. 12, 1884	2,100.00
Specific appropriations by river and harbors acts of—	
July 5, 1884	5,000.00
Aug. 5, 1886	5,000.00
Allotted from specific appropriation by river and harbor act of Aug. 11, 1888 (allotment Oct. 17, 1888)	8,700.00
Deficiency act of Oct. 19, 1888	3,600.00
Allotments from permanent indefinite appropriation made by section 6 of river and harbor act of Aug. 11, 1888, for fiscal years, viz:	
1890 (allotment Aug. 23, 1889)	9,000.00
1891 (allotment Aug. 19, 1890, \$8,700.00, less \$3,518.34 withheld in United States Treasury under ruling that only \$6,000.00 can be expended each fiscal year)	5,181.66
1892 (allotment July 17, 1891)	5,100.00
1893 (allotment July 15, 1892)	5,500.00
1894 (allotment July 18, 1893)	5,500.00
1895 (allotment June 5, 1894)	5,500.00
1896 (allotment June 4, 1895)	5,500.00
1897 (allotment May 13, 1896)	5,500.00
1898 (allotment June 16, 1897)	5,500.00
1899 (allotments May 27, 1898, \$5,500.00, July 12, 1898, \$500.00)	6,000.00
1900 (allotment June 1, 1899)	5,500.00
1901 (allotment July 2, 1900)	6,000.00
1902 (allotment July 31, 1901)	6,000.00
Allotments from permanent annual appropriation made by section 6 of river and harbor act of Aug. 11, 1888, as amended by section 9 of river and harbor act of June 13, 1902, for fiscal years, viz:	
1903 (allotment July 23, 1902, \$9,600.00, less \$500.00 allotted Aug. 2, 1902, to St. Paul, Minn., district)	9,100.00
1904 (allotment Apr. 18, 1903)	9,100.00
1905 (allotment Aug. 11, 1904)	9,100.00
1906 (allotment June 30, 1905)	9,100.00
1907 (allotment July 2, 1906)	9,100.00
1908 (allotment July 24, 1907)	9,100.00
1909 (allotment July 3, 1908)	9,100.00
1910 (allotment July 13, 1909)	9,100.00
1911 (allotment July 27, 1910)	9,600.00
1912 (allotment Feb. 7, 1911)	9,100.00
1913 (allotment May 29, 1912)	9,100.00
1914	9,100.00
1915 (allotment Sept. 2, 1914)	9,100.00
1916 (allotment July 28, 1915)	9,100.00
1917 (allotment Aug. 3, 1916)	9,100.00
Total	292,181.66

Expended.

	To June 30, 1916.	During year ending June 30, 1917.	Total.
Expenditures	\$263,997.11	\$8,313.92	\$272,312.08
Unexpended balances reverted to Treasury	17,452.85	646.09	18,097.89
Total	281,449.96	8,960.01	290,409.97
Unexpended balance June 30, 1917			1,771.69
Total appropriated, etc.			292,181.66

¹ The amount, \$263,996.16, reported in annual report for 1916, has been decreased \$1.05, by refundments of overpayments, by the secretary, as follows:

October, 1916, voucher 124, March, 1916 (reverted to Treasury)..... \$0.40

February, 1916, voucher 32, April, 1916 (reverted to Treasury)..... .65

1.05

3434 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1917.

APPROPRIATION FOR FLOOD CONTROL, MISSISSIPPI RIVER, AND SACRAMENTO RIVER, CAL., 1918.

Allotment, June 20, 1917, from appropriation by sundry civil act of June 12, 1917----- \$5,660,000.00
 Balance unexpended June 30, 1917----- 5,660,000.00

APPROPRIATION FOR REBUILDING LEVEES OF THE MISSISSIPPI RIVER AND TRIBUTARIES DAMAGED BY FLOODS.

Joint resolution of April 30, 1912----- \$1,500,000.00
 Allotments:

Surveys, Ohio and Mississippi Rivers (allotment May 8, 1912)-----	\$1,000.00
Cairo drainage district (allotment May 21, 1912)-----	45,000.00
Upper St. Francis levee district (allotments May 21, 1912, \$65,000, and June 18, 1912, \$15,000)-----	80,000.00
Reelfoot levee district (allotment May 21, 1912)-----	60,000.00
Lower St. Francis levee district (allotments May 21, 1912, \$200,000, June 18, 1912, \$60,000)-----	260,000.00
White River levee district (allotment May 21, 1912)-----	175,000.00
Lower Yazoo levee district (allotment May 21, 1912)-----	173,000.00
Upper Tensas levee district (allotment May 21, 1912)-----	269,000.00
Red River levees (allotment May 21, 1912)-----	10,000.00
Atchafalaya levee district (allotment May 21, 1912)-----	150,000.00
Lafourche levee district (allotment May 21, 1912)-----	100,000.00
Lake Borgne levee district (allotment May 21, 1912)-----	10,000.00
East bank Mississippi River from Vicksburg to Bayou Sara, previously reported as allotments to Gum Ridge drainage district, Miss., Fort Adams to Tunica, La., and Bayou Sara La. (approved May 21, 1912)-----	50,000.00
Lower Tensas levee district, Palmyra (allotment June 18, 1912)-----	11,000.00
Lower Tensas levee district, Bougere (allotment June 18, 1912)-----	9,000.00
Bayou des Glaises, Atchafalaya, Red River etc., (allotment June 18, 1912)-----	30,000.00
Lower Yazoo levee district (allotment July 22, 1912)-----	37,000.00
Upper Tensas levee district (allotment July 22, 1912)-----	30,000.00

1,500,000.00

Miscellaneous receipts, previously reported----- 1,169.66

1,501,169.66

Expended.

	To June 30, 1916.	During year ending June 30, 1917.	Total.
Expenditures-----	\$1,445,114.49	.....	\$1,445,114.49
Unexpended balance, carried to surplus fund June 30, 1914..	.....	.....	56,055.17
Total appropriated, etc-----	.....	.....	1,501,169.66

Appropriation for improving Yazoo River and tributaries, Miss.¹

Act of July 13, 1892	\$75,000.00
Act of Aug. 18, 1894	225,000.00
Act of Aug. 18, 1894	40,000.00
Act of June 4, 1897	350,000.00
Act of Mar. 3, 1901	510,000.00
Act of Mar. 3, 1909 (allotment Mar. 29, 1909)	44,000.00
Act of June 25, 1910	4,000.00
Act of July 25, 1912	5,000.00
Act of Mar. 4, 1913	10,000.00

Miscellaneous receipts, previously reported..... 1,263,000.00
 .30

Total..... 1,263,000.30

Expended.

	To June 30, 1916.	During year ending June 30, 1917.	Total.
Expenditures.....	\$1,248,277.78		\$1,248,277.78
Unexpended balance.....			¹ 14,722.52
Total appropriated, etc.....			1,263,000.30

¹Funds under this appropriation were transferred to the control of the district engineer officer, Vicksburg (Miss.) district, Oct. 9, 1916, under provision of river and harbor act July 27, 1916. (ED. 7716-38.)

APPROPRIATION FOR MAINTAINING AND PROTECTING LEVEES OF MISSISSIPPI RIVER
AND TRIBUTARIES AGAINST FLOODS.

Act of April 3, 1912..... \$350,000.00
 Act of April 16, 1912..... 300,000.00

Total specific appropriations..... 650,000.00
 Miscellaneous receipts previously reported..... 490.80

Total..... 650,490.80

Expended to June 30, 1914..... 454,124.11
 Amount carried to surplus fund June 30, 1913..... 195,850.59
 Unexpended balance carried to surplus fund June 30, 1914..... 516.10

Total..... 650,490.80

APPROPRIATION FOR EXAMINATIONS, SURVEYS, AND CONTINGENCIES OF RIVERS AND
HARBORS.

Allotments from appropriation by river and harbor act of March 3,
1905, for Ashport, Tenn. (allotments Mar. 29, 1905, \$25, and May 8,
1905, \$460)..... \$485.00

Allotment from appropriation by river and harbor act of March 4,
1913, for canal leading from Centennial Lake at Vicksburg, Miss.,
to the Mississippi River..... 2,000.00

Expended during fiscal year 1906..... \$485.00

Expended during fiscal year 1914..... 2,000.00
 2,485.00

¹Funds under this appropriation were transferred to the control of the district engineer officer, Vicksburg (Miss.) district, Oct. 9, 1916, under provision of river and harbor act July 27, 1916. (ED 7716-38.)

3486 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1917.

APPROPRIATION FOR REMOVING SUNKEN VESSELS OR CRAFT OBSTRUCTING OR ENDANGERING NAVIGATION—INDEFINITE.

Allotment for removing wreck of barkentine <i>Rachel Emery</i> -----	\$1, 500. 00
Expended in fiscal year 1913-----	1, 500. 00
<hr/>	
Allotment for removing wreck of bark <i>Santos Amaral</i> -----	8, 000. 00
June 30, 1916, expended in fiscal year-----	\$6. 11
Expended during fiscal year 1917-----	7, 993. 89
	<hr/>
	8, 000. 00

APPROPRIATION FOR REPAIRING GOVERNMENT LEVEE AT WALNUT BEND, ARK.¹

Act of June 13, 1902 (river and harbor)-----	\$90, 000. 00
Expended to June 30, 1906-----	90, 000. 00

APPROPRIATION FOR WATERWAY FROM LOCKPORT, ILL., TO ST. LOUIS, MO.

Act of June 13, 1902 (river and harbor)-----	\$25, 000. 00
Amount transferred from allotment for "Survey of Illinois and Des Plaines Rivers, Ill.," as reimbursement-----	1, 093. 40
	<hr/>
Total -----	26, 093. 40
Expended to June 30, 1906-----	\$22, 291. 23
Unexpended balance carried to surplus fund on June 30, 1909, under the provisions of section 10 of sundry civil act of March 4, 1909-----	3, 802. 17
	<hr/>
	26, 093. 40

APPROPRIATIONS FOR EMERGENCIES IN RIVER AND HARBOR WORKS.

Allotments from appropriation by act of April 23, 1904:	
For Wolf River (allotment July 6, 1904)-----	\$8,000. 00
For Giles Bend, Miss. (allotment July 6, 1904)-----	40, 000. 00
	<hr/>
	48, 000. 00
Expended in fiscal year 1905-----	48, 000. 00
<hr/>	
Allotments from appropriation by act of March 3, 1905:	
For Old River (allotments Oct. 5, 1908, \$6,000, and Nov. 12, 1908, \$4,000)-----	10, 000. 00
Expended in fiscal year 1909-----	10, 000. 00

APPROPRIATION FOR CLAIMS FOR DAMAGES BY COLLISION, RIVER AND HARBOR WORKS.

Act of April 6, 1914 (urgent deficiency)-----	\$73. 84
Expended in fiscal year 1914-----	73. 84
	<hr/>
Act of September 8, 1916 (general deficiency)-----	475. 28
Expended in fiscal year 1917-----	475. 28

¹ Prior to June 30, 1906, was reported under appropriation for "Improving Mississippi River."

CONTRIBUTED FUNDS.

For improvement of Mississippi River at Trotters Point, Miss-----	\$100,000.00
June 30, 1914, expended in fiscal year-----	100,000.00
	<hr/>
For improvement of Mississippi River near Memphis, Tenn-----	\$1,800.00
June 30, 1914, expended in fiscal year-----	\$1,066.61
Unexpended balance refunded to contributor-----	733.39
	<hr/>
	1,800.00
	<hr/>
For improvement of Mississippi River at Avondale, La-----	45,000.00
June 30, 1914, expended in fiscal year-----	\$32,467.28
Unexpended balance refunded to contributor-----	12,532.72
	<hr/>
	45,000.00
	<hr/>
For improvement of Mississippi River at Torras, La-----	3,000.00
June 30, 1914, expended in fiscal year-----	\$2,453.74
Unexpended balance refunded to contributor-----	546.26
	<hr/>
	3,000.00
	<hr/>
For improvement of Mississippi River at Star Landing Bend, Miss-----	210,000.00
June 30, 1914, expended in fiscal year-----	\$35,009.30
June 30, 1915, expended in fiscal year-----	174,990.70
	<hr/>
	210,000.00
	<hr/>
For improvement of Mississippi River near Laconia Circle, Ark-----	8,000.00
June 30, 1915, expended in fiscal year-----	8,000.00
	<hr/>
	<hr/>
For improvement of Mississippi River at Delta, Miss-----	160,000.00
June 30, 1915, expended in fiscal year-----	\$24,871.79
June 30, 1916, expended in fiscal year-----	135,128.21
	<hr/>
	160,000.00
	<hr/>
For improvement of Mississippi River in Upper St. Francis levee district-----	¹ 234,000.00
June 30, 1917, expended in fiscal year-----	\$26,734.69
July 1, 1917, amount covered by existing contracts---	207,265.31
	<hr/>
	234,000.00
	<hr/>
For improvement of Mississippi River at Gayoso Bend. Mo-----	150,000.00
June 30, 1917, expended in fiscal year-----	150,000.00
	<hr/>
	<hr/>
For improvement of Mississippi River in the Reelfoot levee dis- trict (Kentucky)-----	25,000.00
June 30, 1917, expended in fiscal year-----	25,000.00

¹ The amount, \$200,000, reported in annual report for 1916, has been increased by additional deposits of \$34,000.

*Recapitulation of appropriations, expenditures, etc., under direction of the
Mississippi River Commission to June 30, 1917.*

Appropriation for—	Expended to June 30, 1917.	Carried to surplus fund, reverted balances returned to contributors, transferred to other districts and unallotted.	Balance unexpended June 30, 1917.	Total appropriated, etc.
Improving Mississippi River.....	\$79,885,370.76	¹ \$7,598.06	\$3,518,003.72	\$83,420,972.54
Maintenance and improvement of existing river and harbor works.....	6,972,142.91	.....	789,260.27	7,761,403.18
Flood control, Mississippi River, and Sacra- mento River, Cal., 1918.....	.....	² 5,680,000.00	.....	5,680,000.00
Gauging waters of the Mississippi River and its tributaries ³	⁴ 132,498.59	⁵ 11,158.09	1,771.69	145,428.27
Rebuilding levees of the Mississippi River and its tributaries damaged by floods.....	1,445,114.49	¹ 56,055.17	.....	1,501,169.66
Improving Yazoo River and tributaries, Miss. Maintaining and protecting levees of Missis- sippi River and tributaries against floods.....	⁶ 4,442.29	⁷ 14,722.52	.....	19,164.81
Examinations, surveys, and contingencies of rivers and harbors.....	454,124.11	¹ 196,366.69	.....	650,490.80
Removing sunken vessels or craft obstructing or endangering navigation, indefinite.....	2,485.00	.....	.....	2,485.00
Repairing Government levee at Walnut Bend, Ark.....	9,500.00	.....	.....	9,500.00
Waterway from Lockport, Ill., to St. Louis, Mo. Emergencies in river and harbor works.....	90,000.00	.....	.....	90,000.00
Claims for damages by collision, river and harbor works.....	22,291.23	¹ 3,802.17	.....	26,093.40
Contributed funds.....	58,000.00	.....	.....	58,000.00
	549.12	.....	.....	549.12
	715,722.32	⁸ 13,812.37	207,265.31	936,800.00
Total.....	89,802,240.82	5,963,516.07	4,516,300.99	100,282,056.88

¹ Carried to surplus fund.² Unallotted.³ Since Feb. 11, 1901.⁴ The amount \$124,185.72, reported in annual report for 1916, reduced \$1.05 by refundments of overpay-
ments by the secretary, as follows:

October, 1916, voucher 124, March, 1916..... \$0.40

February, 1916, voucher 32, April, 1916..... .65

1.05

⁵ Unexpended balance reverted to Treasury.⁶ Since Mar. 4, 1913.⁷ Transferred to control of district engineer officer, Vicksburg, Miss., district, Oct. 9, 1916, under pro-
vision of river and harbor act July 27, 1916. (ED 7716-38.)⁸ Returned to contributors.

**Consolidated statement of condition of appropriations and allotments under
Mississippi River Commission on June 30, 1917.**

SECRETARY, MISSISSIPPI RIVER COMMISSION.

[Appropriations: Mississippi River; maintenance and improvement of existing river and harbor works; gauging waters of the Mississippi River and its tributaries; waterway from Lockport, Ill., to St. Louis, Mo.; for claims for damages by collision, river and harbor works.]

Appropriations.	Appropriation for Mississippi River, allotment for—				
	Mississippi River Commission.	Surveys, gauges, and observations.	Dredges and dredging.	Examination from Cape Girardeau, Mo., to Rock Island, Ill.	Levees, Rock Island to New Boston, Ill.
Amount expended on previous projects.....	\$238,110.74	\$855,247.37	.....	.....	.....
Amount expended on present project to end of last fiscal year.....	806,761.62	1,697,991.16	\$8,389,076.00	\$8,621.54	.....
Balance unexpended at end of last fiscal year.	1,522.78	3,598.38	22,481.81	1,378.46	.....
Amount appropriated or allotted since (net).	50,014.02	60,000.00	271,000.50	.....	\$15,000.00
	51,536.80	63,598.38	293,482.31	1,378.46	15,000.00
Amount expended from beginning of present fiscal year to end of previous month.....	128,877.97	\$42,128.78	\$93,623.25	1,378.76	275.12
Amount expended during the month.....	6,001.24	6,205.16	\$10,666.84	4.70	.....
	34,879.21	48,333.94	\$110,290.09	1,378.46	275.12
Balance unexpended at end of month.	16,657.69	15,264.44	183,192.22	.....	14,724.88
In Treasury United States.....	16,657.69	15,264.44	183,192.22	.....	14,724.88
Outstanding liabilities at end of month....	3,078.20	2,309.10	29,806.99	.....	.....
Amount covered by existing contracts at end of month.....	7.40	7,947.80	89,035.02	.....	.....
	3,085.60	10,256.90	118,842.01	.....	.....
Balance available at end of month....	13,571.99	5,007.54	\$64,350.21	.....	14,724.88

¹ Amount, \$28,882.42, previously reported, reduced \$4.55, refundment of overpayment on voucher No. 24, November, 1916.

² Amount, \$42,196.28, previously reported, reduced \$67.50 by reimbursement from office of first and second Mississippi River districts for coal furnished by secretary's office. (Sec. M.R.C. 368-329 and 330.)

³ Amount, \$68,524.24, previously reported, reduced \$4,900.99 by following reimbursements: \$55 from St. Louis district office for coal furnished by secretary's office, and \$4,845.99 by first and second Mississippi River district offices for coal furnished by secretary's office. (ED 104197-506, Sec. M.R.C. 1256-77; Sec. 369-329 and 330.)

⁴ Includes transfers of \$316.70 (\$121.40 and \$195.30) on books of office, Chief of Engineers, under date of June 21, 1917, to allotment for "Plant" third Mississippi River district, for coal furnished the secretary's office. (ED 24723-29 and 31, Sec. M.R.C. 2228-10 and 12.)

⁵ Includes \$1,191.28 reimbursable, as follows: \$740, from appropriation for Army Transportation, fiscal year 1916-17; \$451.28 from St. Louis district office.

⁶ Does not include \$1,191.28 reimbursable, as follows: \$740, from appropriation for Army transportation, fiscal year 1916-17; \$451.28 from St. Louis district office.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1917—Continued.

SECRETARY, MISSISSIPPI RIVER COMMISSION—Continued.

Appropriations.	Appropriation for Mississippi River, allotment for—Cont.				
	Levees, Muscatine to mouth of Iowa River, Iowa.	Levees, Oquawka to Dallas, Ill.	Levees, Warsaw to Quincy, Ill.	Levees, La Grange to mouth of Missouri River, Mo.	Levees, Quincy to Hamburg Bay, Ill.
Amount expended on present project to end of last fiscal year.....			\$14,702.06	\$37,753.81	\$24,370.75
Balance unexpended at end of last fiscal year....			5,297.94	2,146.28	35,629.25
Amount appropriated or allotted since (net)....	\$30,000.00	\$20,000.00	30,000.00	20,000.00	70,000.00
	30,000.00	20,000.00	35,297.94	22,146.28	105,629.25
Amount expended from beginning of present fiscal year to end of previous month.....	360.90	645.26	3,444.38	335.05	400.19
Amount expended during the month.....	12.28	46.53	4.34	1,392.92	5.65
	373.18	691.89	3,448.72	1,727.97	405.84
Balance unexpended at end of month.....	29,626.82	19,308.11	31,849.22	20,418.31	105,223.41
In Treasury United States.....	29,626.82	19,308.11	31,849.22	20,418.31	105,223.41
Outstanding liabilities at end of month.....	26.18	25.99	16.34	197.41	8.40
Amount covered by existing contracts at end of month.....			6,392.31	16,338.42	4,422.03
	26.18	25.99	6,408.65	16,535.83	4,430.43
Balance available at end of month.....	29,600.64	19,282.12	25,440.57	3,882.48	100,792.98

Appropriations.	Appropriation for Mississippi River, allotment for—Continued.		
	Levees, head of Chouteau Island to Prairie du Pont, Ill.	Levees, Grand Tower to Gale near Thebes, Ill.	Expanded allotments. Total.
Amount expended on previous projects.....			\$1,093,358.11
Amount expended on present project to end of last fiscal year.....	\$60,000.00		\$71,231.05 9,112,508.49
Balance unexpended at end of last fiscal year.....			72,054.90
Amount appropriated or allotted since (net).....	25,000.00	\$20,000.00	611,014.52
	25,000.00	20,000.00	683,069.42
Amount expended from beginning of present fiscal year to end of previous month.....	459.29	2,020.14	173,944.19
Amount expended during the month.....	218.83	2,143.16	32,701.65
	678.12	4,163.30	206,645.84
Balance unexpended at end of month.....	24,321.88	15,836.70	476,423.58
In Treasury United States.....	24,321.88	15,836.70	476,423.58
Outstanding liabilities at end of month.....	15.00	152.00	35,635.61
Amount covered by existing contracts at end of month.....	14,100.00	12,154.68	150,397.66
	14,115.00	12,306.68	186,033.27
Balance available at end of month.....	10,206.88	3,530.02	290,390.31

¹ Experimental dikes, \$45,075.58; patrol of the Mississippi River, \$1,055.56; spillway surveys, \$15,000; levees, Muscatine to Port Louis, Iowa, \$90.91; levees, Grand Tower to near Thebes, Ill., \$10,000.

Consolidated statement of condition of of appropriations and allotments under Mississippi River Commission on June 30, 1917—Continued.

SECRETARY, MISSISSIPPI RIVER COMMISSION—Continued.

Appropriations.	Appropriation for maintenance and improvement of existing river and harbor works, act of Oct. 2, 1914, allotment for—			
	Mississippi River Commission.	Surveys, gages, and observations.	Dredges and dredging.	Total.
Amount expended on present project to end of last fiscal year.....	\$29,991.18	\$59,896.54	\$296,360.63	\$386,248.35
Balance unexpended at end of last fiscal year.....	8.82	108.46	1,639.87	1,751.65
Amount expended from beginning of present fiscal year to end of previous month.....		39.62	74.75	114.37
Balance unexpended at end of month.....	8.82	63.84	1,564.62	1,637.28
In Treasury United States.....	8.82	63.84	1,564.62	1,637.28
Balance available at end of month.....	8.82	63.84	1,564.62	1,637.28

Appropriations.	Appropriation for maintenance and improvement of existing river and harbor works, act of Mar. 4, 1915, allotment for—			
	Mississippi River Commission.	Surveys, gages, and observations.	Dredges and dredging.	Total.
Amount expended on present project to end of last fiscal year.....	\$31,969.15	\$26,534.91	\$85,600.11	\$144,104.17
Balance unexpended at end of last fiscal year.....	8,030.85	33,465.09	314,399.89	355,895.83
Amount appropriated or allotted since (net).....		.79		.79
	8,030.85	33,465.88	314,399.89	355,896.62
Amount expended from beginning of present fiscal year to end of previous month.....	7,790.96	16,626.62	221,626.66	246,044.24
Balance unexpended at end of month.....	239.89	16,839.26	92,773.23	109,852.38
In Treasury United States.....	239.89	16,839.26	92,773.23	109,852.38
Balance available at end of month.....	239.89	16,839.26	92,773.23	109,852.38

3442 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1917.

Consolidated statement of condition of of appropriations and allotments under Mississippi River Commission on June 30, 1917—Continued.

SECRETARY, MISSISSIPPI RIVER COMMISSION—Continued.

Appropriations.	Appropriation for gaging waters of the Mississippi River and its tributaries.	Expended appropriations.	Appropriation for claims for damages by collision, river and harbor works (claim of West Kentucky Coal Co.).	Grand total.
Amount expended on previous projects.....	.....	.....	.....	\$1,093,358.11
Amount expended on present project to end of last fiscal year.....	\$263,997.11	\$22,350.07	.....	9,931,208.19
Balance unexpended at end of last fiscal year.....	\$ 986.66	.....	.....	430,699.04
Amount appropriated or allotted since (net).....	9,100.00	.....	\$427.30	620,542.61
	10,096.66	.....	427.30	1,051,231.65
Amount expended from beginning of present fiscal year to end of previous month.....	7,278.80	.....	427.30	427,806.90
Amount expended during the month.....	\$ 1,036.17	.....	.....	83,737.82
	8,314.97	.....	427.30	461,546.72
Balance unexpended at end of month.....	1,771.69	.....	.....	589,684.93
In Treasury United States.....	1,771.69	.....	.....	589,684.93
Outstanding liabilities at end of month.....	906.59	.....	.....	36,542.20
Amount covered by existing contracts at end of month.....	.....	.....	.....	150,397.66
	906.59	.....	.....	186,939.56
Balance available at end of month.....	865.19	.....	.....	402,745.07

¹ Waterway from Lockport, Ill., to St. Louis, Mo., \$22,291.23; unexpended balance, \$3,902.17, of this appropriation carried to surplus fund June 30, 1909, under provisions of sec. 10 of sundry civil act of Mar. 4, 1909 (R.D. 46903-142, sec. MRC 1125-9). Claims for damages by collision, river and harbor works, \$63.84.

² Of the unexpended balance for 1916, \$646.06 reverted to the Treasury.

³ Does not include \$4.50 overpayment on voucher 5 for June, refunded during the month.

WORKS ABOVE CAIRO.

[Appropriation: Improving Mississippi River.]

Appropriations.	Protection near Cairo. ¹	Pes Moines Rapids to Ohio River.	Total.
Amount expended on present project to end of last fiscal year..	\$50,000.00	\$687,632.53	\$737,632.53

¹ Includes only work under act of July 5, 1884.

**Consolidated statement of condition of appropriations and allotments under
Mississippi River Commission on June 30, 1917—Continued.**

FIRST AND SECOND DISTRICTS.

[Appropriations: Mississippi River: Maintenance and improvement of existing river and harbor works; repairing Government levee at Walnut Bend, Ark.; emergencies in river and harbor works; examinations, surveys, and contingencies of rivers and harbors; rebuilding levees of the Mississippi River and tributaries damaged by flood; maintaining and protecting levees of Mississippi River and tributaries against floods; for claims for damages by collision, river and harbor works.]

Appropriations.	Maintenance and improvement of existing river and harbor works, act of Oct. 2, 1914, allotment for—					
	Upper St. Francis levee district.	Western Point, Ky (dike at Slough Landing Neck).	Star Landing, Miss.	General repairs and stone.	Expended allotments.	Total.
Amount expended on present project to end of last fiscal year.....	\$68,514.80	\$112,526.86	\$84,874.71	\$49,889.99	\$316,022.86	\$1,161,335.22
Balance unexpended at end of last fiscal year.....	1,485.20	473.14	20,125.29	10,610.01	.....	32,698.64
Amount expended from beginning of present fiscal year to end of previous month.....	1,485.20	30.20	20,125.29	10,610.01	.....	32,250.70
Balance unexpended at end of month.....	.....	442.94	.....	.....	.....	442.94
In hand.....	.....	442.94	.....	.....	.....	442.94
Balance available at end of month.....	.....	442.94	.....	.....	.....	442.94

Appropriations.	Maintenance and improvement of existing river and harbor works, act of Mar. 4, 1915, allotment for—			
	Upper St. Francis levee district.	Lower St. Francis levee district.	White River levee district.	Slough Landing Neck, Tenn.
Amount expended on present project to end of last fiscal year.....	\$14,325.14	\$152,667.10	\$36,190.51	\$158,200.80
Balance unexpended at end of last fiscal year.....	50,674.86	162,333.55	133,809.49	41,790.20
Amount appropriated or allotted since (not).....	50,674.86	162,333.55	133,809.94	41,790.20
Amount expended from beginning of present fiscal year to end of previous month.....	25,569.26	162,333.55	100,949.78	32,031.95
Amount expended during the month.....	2,095.09	.....	9,617.95	1,000.00
Balance unexpended at end of month.....	23,010.51	.....	23,242.21	8,758.25
In Treasury United States.....	20,347.04	.....	8,001.08	5,028.84
In hand.....	2,663.47	.....	15,241.13	8,729.41
Outstanding liabilities at end of month.....	23,010.51	.....	23,242.21	8,758.25
Amount covered by existing contracts at end of month.....	23,010.51	.....	23,242.21	8,729.41
Balance available at end of month.....	.....	.....	.....	200.00
	.....	.....	.....	200.00
	.....	.....	.....	8,558.25

¹ Surveys, \$1,500; Slough Landing Neck, Tenn., \$175,000; Lower St. Francis levee district, \$437,000; White River levee district, \$160,000; plant, \$40,023.96; experimental reclamation, \$2,500.

² Distributed as follows: Star Landing, Miss., \$1,734.54; Trotters Point, Miss., \$2.23; Sunflower, Miss., \$25; plant, \$8,575.19.

3444 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1917.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1917—Continued.

FIRST AND SECOND DISTRICTS—Continued.

Appropriations.	Maintenance and improvement of existing river and harbor works, act of Mar. 4, 1915, allotment for—			
	Plum Point reach.	Delta, Miss.	General repairs and stone.	Plant.
Amount expended on present project to end of last fiscal year.....	\$69,478.19	\$11,554.41	.....	\$86,039.21
Balance unexpended at end of last fiscal year.....	55,521.81	193,445.59	\$50,000.00	8,940.79
Amount expended from beginning of present fiscal year to end of previous month.....	55,521.81	81,033.46	43,032.14	8,927.32
Amount expended during the month.....	.....	2,002.25	6,967.86	13.47
	55,521.81	83,035.71	50,000.00	8,940.79
Balance unexpended at end of month.....	.....	10,409.88	.....	.....
In Treasury of United States.....	.....	9,000.00	.....	.....
In hand.....	.....	1,409.88	.....	.....
	.....	10,409.88	.....	.....
Outstanding liabilities at end of month.....	.....	200.00	.....	.....
Balance available at end of month.....	.....	10,209.88	.....	.....

Appropriations.	Maintenance and improvement of existing river and harbor works, act of Mar. 4, 1915, allotment for—				
	New plant.	Experimental revetment.	Memphis Harbor.	Expended allotments.	Total.
Amount expended on present project to end of last fiscal year.....	\$25,974.87	\$22,013.75	.....	\$3,000.00	\$579,472.96
Balance unexpended at end of last fiscal year.....	29,025.13	2,986.25	\$25,000.00	.....	653,527.67
Amount appropriated or allotted since (net).....	.....	.....	.....	.....	.45
	29,025.13	2,986.25	25,000.00	.....	653,528.12
Amount expended from beginning of present fiscal year to end of previous month.....	14,025.13	156.98	.....	.....	523,581.38
Amount expended during the month.....	.....	.....	.....	.....	21,696.62
	14,025.13	156.98	.....	.....	545,278.00
Balance unexpended at end of month.....	15,000.00	2,829.27	25,000.00	.....	108,250.12
In Treasury United States.....	.....	475.72	25,000.00	.....	67,852.68
In hand.....	15,000.00	2,353.55	.....	.....	40,397.44
	15,000.00	2,829.27	25,000.00	.....	108,250.12
Outstanding liabilities at end of month.....	15,000.00	2,829.27	6,500.00	.....	24,729.27
Amount covered by existing contracts at end of month.....	.....	.....	.....	.....	46,252.72
	15,000.00	2,829.27	6,500.00	.....	70,981.99
Balance available at end of month.....	.....	.....	18,500.00	.....	37,268.13

¹ Amount, \$118,445.59, reduced \$25,000, transfer to allotment for "Memphis Harbor," approved by Acting Secretary of War, June 11, 1917. (ED 15927-520.)

² Distributed as follows: Slough Landing Neck, Tenn., \$535.30; Barfield, Ark., \$1,545.98; Plum Point reach, \$20,041.39; Hopedale Bend (preservation of works at), \$7,296.03; Star Landing, Miss., \$8,866.62; Sunflower, Miss., \$172.50; plant, \$9,979.81; stone, \$1,573.37.

³ Surveys, \$3,000.

⁴ Transferred from allotment for "Delta, Miss.," approved by Acting Secretary of War June 11, 1917.

*Consolidated statement of condition of appropriations and allotments under
Mississippi River Commission on June 30, 1917—Continued.*

FIRST AND SECOND DISTRICTS—Continued.

Appropriations.	Mississippi River, allotment for—				
	Surveys.	Upper St. Francis levee district.	Lower St. Francis levee district.	White River levee district.	Reelfoot levee district.
Amount expended on present project to end of last fiscal year.....	\$157,881.71	\$820,300.00	\$2,943,189.05	\$2,534,645.80	\$345,000.00
Amount appropriated or allotted since (net).....	5,004.32	100,000.00	270,000.00	100,000.00	40,000.00
Amount expended from beginning of present fiscal year to end of previous month.....	4,535.06		11,420.52		
Amount expended during the month.....	469.26		23,946.96		8,029.66
	5,004.32		35,367.48		8,029.66
Balance unexpended at end of month.....		100,000.00	234,632.52	100,000.00	31,970.34
In Treasury United States.....		100,000.00	210,000.00	100,000.00	17,000.00
In hand.....			24,632.52		14,970.34
		100,000.00	234,632.52	100,000.00	31,970.34
Outstanding liabilities at end of month.....		1,000.00	1,200.00	600.00	200.00
Amount covered by existing contracts at end of month.....		95,500.00	189,200.00	79,400.00	22,000.00
		95,500.00	190,400.00	80,000.00	22,200.00
Balance available at end of month.....		3,500.00	44,232.52	20,000.00	9,770.34

Appropriations.	Mississippi River, allotment for—				
	Gayoso Bend, Mo.	Barfield, Ark.	Bullerton Bar, Ark.	Wolf River.	Porter Lake, Ark.
Amount expended on present project to end of last fiscal year.....				\$0,807.21	\$329,928.59
Balance unexpended at end of last fiscal year.....				192.79	
Amount appropriated or allotted since (net).....	\$150,000.00	\$200,000.00	\$150,000.00		105,000.00
	150,000.00	200,000.00	150,000.00	192.79	105,000.00
Amount expended from beginning of present fiscal year to end of previous month.....	45,371.66	131,555.75	69,857.29	192.79	25,932.87
Amount expended during the month.....	11,406.90	18,174.28	5,388.39		8,520.79
	56,778.56	149,730.03	65,245.68	192.79	34,453.66
Balance unexpended at end of month.....	93,221.44	50,269.97	84,757.32		70,546.34
In Treasury United States.....	81,000.00	39,366.60	79,000.00		59,500.00
In hand.....	12,221.44	10,903.37	5,757.32		11,046.34
	93,221.44	50,269.97	84,757.32		70,546.34
Outstanding liabilities at end of month.....	20,500.00	10,500.00	1,800.00		9,800.00
Amount covered by existing contracts at end of month.....	31,900.00	20,500.00	2,000.00		37,800.00
	52,400.00	31,000.00	3,800.00		47,600.00
Balance available at end of month.....	40,821.44	19,269.97	80,957.32		22,946.34

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1917—Continued.

FIRST AND SECOND DISTRICTS—Continued.

Appropriations.	Mississippi River, allotment for—				
	Helena, Ark.	Old Town Bend, Ark.	Memphis Harbor.	Repairs to existing works, and stone.	General repairs, and stone.
Amount expended on present project to end of last fiscal year	\$226,308.07	\$350,480.50	.....	(¹)	.....
Balance unexpended at end of last fiscal year	31,320.75	.....	.....	.....	.....
Amount appropriated or allotted since (net) .....	.....	105,000.00	\$26,000.00	.....	\$50,000.00
.....	31,320.75	105,000.00	26,000.00	.....	50,000.00
Amount expended from beginning of present fiscal year to end of previous month	1,150.33	58,720.24	12,047.97	.....	2,717.27
Amount expended during the month .....	.....	19,457.44	9,059.80	.....	1,311.23
.....	1,150.33	78,177.68	21,107.77	.....	\$ 4,028.50
Balance unexpended at end of month	30,170.42	26,822.32	4,892.23	.....	45,971.50
In Treasury United States	30,000.00	22,000.00	.....	.....	40,000.00
In hand	170.42	4,822.32	4,892.23	.....	5,971.50
.....	30,170.42	26,822.32	4,892.23	.....	45,971.50
Outstanding liabilities at end of month .....	.....	9,400.00	4,892.23	.....	2,100.00
Amount covered by existing contracts at end of month .....	.....	14,400.00	.....	.....	21,350.00
.....	.....	23,800.00	4,892.23	.....	21,450.00
Balance available at end of month ..	30,170.42	3,022.32	.....	.....	22,521.50

¹ Total expenditures (\$210,000) under this allotment to end of fiscal year 1916 have been distributed to following works: Slough Landing Neck, \$31,376.96; Plum Point reach, \$11,375.71; Star Landing, Miss., \$16,611.69; Delta, Miss., \$965.24; plant (repairs), \$469.67; Hopefield Bend, \$7,533.26; improving harbor at Memphis, Tenn., \$1,340.91; Old Town Bend, Ark., \$2,683.33; Porter Lake, Ark., \$26,129.42; Helena, Ark., \$7,475.01; Golden Lake, Ark., \$12,323; Sunflower, Miss., \$14,423.25; stone, \$76,962.55.

² Distributed as follows: Star Landing, Miss., \$609.26; stone, \$3,419.24.

*Consolidated statement of condition of appropriations and allotments under
Mississippi River Commission on June 30, 1917—Continued.*

FIRST AND SECOND DISTRICTS—Continued.

Appropriations.	Mississippi River, allotment for—				Expended appropriations.
	Plant.	New plant.	Expended allotments.	Total.	
Amount expended on present project to end of last fiscal year.	\$1,839,759.65	\$617,345.38	\$11,447,812.30	\$21,700,459.26	\$223,058.97
Balance unexpended at end of last fiscal year.		2,133.33		23,646.87	
Amount appropriated or allotted since (net).	75,380.50	297,000.00		1,673,384.82	
	75,380.50	299,133.33		1,707,031.69	
Amount expended from beginning of present fiscal year to end of previous month.	44,635.77	113,077.47		511,214.99	
Amount expended during the month.	4,400.54	4,263.95		114,426.20	
	49,036.31	117,341.42		625,641.19	
Balance unexpended at end of month.	26,344.19	181,791.91		1,081,390.50	
In Treasury United States.	17,000.00	167,000.00		961,466.60	
In hand.	9,344.19	14,791.91		119,923.90	
	26,344.19	181,791.91		1,081,390.50	
Outstanding liabilities at end of month.	5,600.00	46,000.00		113,562.23	
Amount covered by existing contracts at end of month.				514,060.00	
	5,600.00	46,000.00		627,642.23	
Balance available at end of month.	20,744.19	135,791.91		453,748.27	

¹ Upper Yazoo levee district, \$1,468,703.45; Walnut Bend levee, preservation of works at, \$28,200; preservation of works (levees), \$17,909; preservation of works (revetment and contraction works, permanent channel improvement and protection), \$36,958.89; Slough Landing Neck, Tenn., \$206,385.36; Chute of Island 26 (Abatis dikes), \$1,478.11; Plum Point reach, \$5,591,629.22; removal of Nonconah rock, \$9,000; Golden Lake, Ark., \$91,193.91; Walnut Bend, Ark., \$346,309.92; Trotters Point, Miss., \$99,688.10; Sunflower, Miss., \$233,365.56; stone, \$134,803.80; dredges and dredging, \$388,097.12; experimental dikes, \$54,234.62; Columbus, Ky., \$43,750; at Hickman, Ky., \$95,132; at New Madrid, Mo., \$153,000; at Caruthersville, Mo., \$80,314.37; at Memphis, Tenn., \$45,000; improving harbor at Memphis, Tenn., \$1,429,244.94; improving harbor at Memphis, Tenn. (Wolf River), \$45,000; at Memphis, Tenn. (Wolf River), \$25,786; Hopaleki Bend (preservation of works at), \$698,361.20; improving St. Francis River (Walnut Bend levee), \$75,000; survey, east bank Mississippi River, Bessie to Memphis, Tenn., \$11,000; Star Landing, Miss., \$38,611.09; Delta, Miss., \$965.24.

² Repairing Government levee at Walnut Bend, Ark., \$90,000; emergencies in river and harbor works (for Wolf River), \$8,000; examinations, surveys, and contingencies of rivers and harbors, \$485; rebuilding levees of the Mississippi River and tributaries damaged by floods, \$621,000; maintaining and protecting levees of Mississippi River and tributaries against floods, \$104,558.97; for claims for damages by collision river and harbor works, \$15.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1917—Continued.

FIRST AND SECOND DISTRICTS—Continued.

Appropriations.	Grand total.	Funds contributed for improvement of Mississippi River at Gayoso Bend, Mo. (special fund).	Funds contributed for improvement of Mississippi River in Upper St. Francis levee district (special fund).	Funds contributed for improvement of Mississippi River in the Reelfoot levee district (Kentucky special fund).	Expended contributed funds.
Amount expended on present project to end of last fiscal year.	\$24,264,326.43				\$479,066.61
Balance unexpended at end of last fiscal year.	719,868.18		\$200,000.00		
Amount appropriated or allotted since (net).	1,678,385.27	\$150,000.00	34,000.00	\$25,000.00	
	2,393,253.45	150,000.00	234,000.00	25,000.00	
Amount expended from beginning of present fiscal year to end of previous month.	1,067,047.07	150,000.00	18,066.18	22,188.97	
Amount expended during the month.	136,122.82		8,678.51	2,811.03	
	1,203,169.89	150,000.00	26,734.69	25,000.00	
Balance unexpended at end of month.	1,190,083.56		207,265.31		
In Treasury United States.	1,029,719.28		200,000.00		
In hand.	160,364.28		7,265.31		
	1,190,083.56		207,265.31		
Outstanding liabilities at end of month.	138,321.50				
Amount covered by existing contracts at end of month.	560,302.72		207,265.31		
	698,624.22		207,265.31		
Balance available at end of month.	491,459.34				

¹ For improvement of Mississippi River as follows: At Trotters Point, Miss., \$100,000; near Memphis, Tenn., \$1,066.61; near Laconia Circle, Ark., \$8,000; at Star Landing Bend, Miss., \$210,000; at Delta, Miss., \$160,000.

*Consolidated statement of condition of appropriations and allotments under
Mississippi River Commission on June 30, 1917—Continued.*

THIRD DISTRICT.

[Appropriations: Mississippi River; maintenance and improvement of existing river and harbor works; maintaining and protecting levees of the Mississippi River and tributaries against floods; rebuilding levees of the Mississippi River and tributaries damaged by floods; improving Yazoo River and tributaries, Miss.; examinations, surveys and contingencies of rivers and harbors for claims for damages by collision, river and harbor works.]

Appropriations.	Maintenance and improvement of existing river and harbor works, act of Oct. 2, 1914, allotment for—				
	Upper Tensas levee district.	Lower Yazoo levee district.	Repairs to existing works, and stone.	Expended allotments.	Total.
Amount expended on present project to end of last fiscal year.....	\$168,345.84	\$205,611.08	(1)	* \$302,227.96	\$676,184.82
Balance unexpended at end of last fiscal year.....	281,654.31	166,388.97	\$9,787.45		407,830.73
Amount expended from beginning of pres- ent fiscal year to end of previous month..	50,340.98	54,866.80	9,787.45		114,995.23
Amount expended during the month.....	1,294.88	* 74.55			1,369.43
	51,635.86	54,941.35	* 9,787.45		116,364.66
Balance unexpended at end of month.....	180,018.45	111,447.62			291,466.07
In Treasury United States.....	175,000.00	89,967.98			264,967.98
In hand.....	5,018.45	21,479.64			26,498.09
	180,018.45	111,447.62			291,466.07
Outstanding liabilities at end of month...	15,093.53				15,093.53
Amount covered by existing contracts at end of month.....		111,447.62			111,447.62
	15,093.53	111,447.62			126,541.15
Balance available at end of month...	164,924.92				164,924.92

¹ Amount (\$45,445.15) expended during fiscal year 1916, distributed to following works: Lake Bolivar; Front, \$1,729.37; Panther Forest, Ark., \$29,908.02; Greenville, Miss., \$409.45; Fittlers Bend, \$7,301.43; Delta Point, La., \$26.45; Albemarle Bend, \$1.88; stone, \$6,073.55.

² Greenville, Miss., \$80,409.45; surveys, third district, \$2,000; Fittlers Bend, \$11,389.90; Delta Point, La., \$28.33; Reid-Bedford Bend, \$705.71; Ashbrook Neck, \$643.07; Panther Forest, Ark., \$43,998.49; Albemarle Bend, \$4,106.47; Lake Bolivar Front, \$6,864.62; Vaucluse, Ark., \$3,027.15; stone, third district, \$18,888.74; Grand Lake, Ark., \$80,000; plant, third district, \$50,000.

³ Includes \$32.02 in Treasury settlement No. 28357, for freight service.

⁴ Distributed as follows: Lake Bolivar Front, \$773.81; Panther Forest, Ark., \$626.01; Fittlers Bend, \$623.21; Greenville, Miss., \$1,255.15; Delta Point, La., \$1,035.92; Vaucluse, Ark., \$4,672.22; and stone, third district, \$735.13.

*Consolidated statement of condition of appropriations and allotments under
Mississippi River Commission on June 30, 1917—Continued.*

THIRD DISTRICT—Continued.

Appropriations.	Maintenance and improvement of existing river and harbor works, act of Mar. 4, 1915, allotment for—				
	Surveys, third district.	Upper Tensas levee district.	Lower Yazoo levee district.	Lake Bolivar Front.	Ashbrook dike.
Amount expended on present project to end of last fiscal year.....	\$5,035.06	\$69,763.01	\$113,284.43	\$62,147.00	\$2,260.07
Balance unexpended at end of last fiscal year.....	4,964.94	125,236.99	71,716.57	7,853.00	86,664.03
Amount appropriated or allotted since (net).....		6,300.00	6,300.00		
	4,964.94	131,536.99	78,016.57	7,853.00	86,664.03
Amount expended from beginning of present fiscal year to end of previous month.....	2,281.20	94,934.43	69,358.28	7,853.00	86,664.03
Amount expended during the month.....	134.82	2,100.97	1,037.78		
	2,416.02	97,035.40	70,396.06	7,853.00	86,664.03
Balance unexpended at end of month.....	2,548.92	34,501.59	7,120.51		
In Treasury United States.....		21,300.00			
In hand.....	2,548.92	13,201.59	7,020.51		
	2,548.92	34,501.59	7,020.51		
Outstanding liabilities at end of month.....	487.45				
Amount covered by existing contracts at end of month.....		11,207.54	7,620.51		
	487.45	11,207.54	7,620.51		
Balance available at end of month.....	2,061.47	23,294.05			

Appropriations.	Maintenance and improvement of existing river and harbor works, act of Mar. 4, 1915, allotment for—				
	Ashbrook Neck.	Panther Forest, Ark.	Greenville, Miss.	Grand Lake, Ark.	Fittlers Bend.
Amount expended on present project to end of last fiscal year.....	\$37,058.26	\$77,019.59	\$70,472.53	\$56,311.60	\$9,051.27
Balance unexpended at end of last fiscal year.....	37,941.74	42,980.41	39,615.75	3,683.40	50,948.73
Amount expended from beginning of present fiscal year to end of previous month.....	6,753.59	42,980.41	39,615.75	3,683.40	50,948.73
Amount expended during the month.....	4,413.32				
	11,166.91	42,980.41	39,615.75	3,683.40	50,948.73
Balance unexpended at end of month.....	26,774.83				
In Treasury United States.....	30,000.00				
In hand.....	-3,225.17				
	26,774.83				
Outstanding liabilities at end of month.....	17,044.11				
Amount covered by existing contracts at end of month.....	8,327.69				
	25,372.00				
Balance available at end of month.....	1,402.83				

*Consolidated statement of condition of appropriations and allotments under
Mississippi River Commission on June 30, 1917—Continued.*

THIRD DISTRICT—Continued.

Appropriations.	Maintenance and improvement of existing river and harbor works, act of Mar. 4, 1915, allotment for—				Mississippi River, allotment for surveys, third district.
	Repairs to existing works, and stone.	Plant, third district.	Experimental revetment.	Total.	
Amount expended on present project to end of last fiscal year.....		\$170,410.50	\$7,805.14	\$180,615.46	\$151,455.58
Balance unexpended at end of last fiscal year.....	\$25,000.00	9,842.36	194.86	506,647.78	.....
Amount appropriated or allotted since (net).....		2,125.55		14,725.55	5,000.00
	25,000.00	11,967.91	194.86	521,373.33	5,000.00
Amount expended from beginning of present fiscal year to end of previous month.....	25,000.00	11,967.91	194.86	442,240.59	.....
Amount expended during the month.....				7,686.89	.....
	¹ 25,000.00	11,967.91	194.86	449,927.48	.....
Balance unexpended at end of month.....				71,445.85	5,000.00
In Treasury United States.....				51,300.00	5,000.00
In hand.....				20,145.85	
				71,445.85	5,000.00
Outstanding liabilities at end of month.....				17,531.56	.....
Amount covered by existing contracts at end of month.....				27,155.94	.....
				44,687.50	.....
Balance available at end of month.....				26,758.35	5,000.00

¹ Distributed as follows: Grand Lake, Ark., \$38.20; Panther Forest, Ark., \$6.50; Fittlers Bend, \$15,740.55; Greenville, Miss., \$381.22; Vaucuse, Ark., \$6,795.60; and stone, third district, \$1,538.03.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1917—Continued.

THIRD DISTRICT—Continued.

Appropriations.	Mississippi River, allotment for—				
	Upper Tensas levee district.	Lower Yazoo levee district.	Lake Bolivar Front.	Ashbrook Neck.	Ashbrook dike.
Amount expended on present project to end of last fiscal year.....	\$6,899,895.74	\$5,579,715.81	\$365,249.60	\$802,760.70	.....
Amount appropriated or allotted since (net).....	384,000.75	349,000.00	30,000.00	40,000.00	\$312,000.00
Amount expended from beginning of present fiscal year to end of previous month.....	49,531.77	233,384.50	25,902.55		88,669.28
Amount expended during the month.....	31,019.93	40,995.48	235.00	1,654.38	9,003.85
	80,551.70	244,379.98	26,137.55	1,654.38	97,673.13
Balance unexpended at end of month.....	303,449.05	104,620.02	3,862.45	38,345.62	114,326.87
In Treasury United States.....	333,966.41	113,997.12	1,418.76	38,345.62	120,102.47
In hand.....	—30,517.36	—9,377.10	2,443.69		—5,775.60
	303,449.05	104,620.02	3,862.45	38,345.62	114,326.87
Outstanding liabilities at end of month.....	57,566.15	2,387.43			31,283.83
Amount covered by existing contracts at end of month.....	206,851.72	21,073.94			
	264,417.87	23,461.37			31,283.83
Balance available at end of month.....	39,031.18	81,158.05	3,862.45	38,345.62	83,043.04

Appropriations.	Mississippi River, allotment for—				
	Panther Forest, Ark.	Fittlers Bend.	Cottonwood, Miss.	Improving harbor at Vicksburg, Miss.	Reid-Bedford Bend.
Amount expended on present project to end of last fiscal year.....	\$266,734.53	\$380,833.51	.....	\$442,724.77	\$310,074.04
Amount appropriated or allotted since (net).....	70,000.00	9,000.00	220,010.00	100,000.00	100,000.00
Amount expended from beginning of present fiscal year to end of previous month.....	40,909.04	8,807.74	207,597.56	69,726.34	23,509.62
Amount expended during the month.....	2,467.02		6,778.72	233.02	2,969.99
	43,376.06	8,807.74	214,376.28	69,959.36	26,479.61
Balance unexpended at end of month.....	26,623.94	192.26	5,633.72	30,040.64	73,520.39
In Treasury United States.....	11,082.45	192.26	2,120.87	5,562.12	75,000.00
In hand.....	15,541.49		3,512.85	24,478.52	—1,479.61
	26,623.94	192.26	5,633.72	30,040.64	73,520.39
Outstanding liabilities at end of month.....	4,380.53		2,978.92	9,595.60	5,850.31
Amount covered by existing contracts at end of month.....					26,000.00
	4,380.53		2,978.92	9,595.60	31,850.31
Balance available at end of month.....	22,243.41	192.26	2,654.80	20,445.04	41,670.08

¹ Part, Treasury settlement No. 28650, for freight service.² Includes \$2,032.65, part of Treasury settlement No. 28650, for freight service.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1917—Continued.

THIRD DISTRICT—Continued.

Appropriations.	Mississippi River, allotment for—				
	Red Fork, Ark.	Repairs to existing works, and stone.	Plant, third district.	Expended allotments.	Total.
Amount expended on present project to end of last fiscal year.			\$2,283,411.53	\$7,856,472.16	\$25,339,337.92
Amount appropriated or allotted since (net).	\$80,000.00	\$100,000.00	\$290,127.12		1,965,137.67
Amount expended from beginning of present fiscal year to end of previous month.	54,880.38	44,632.37	\$188,110.91		1,035,662.06
Amount expended during the month.	\$18,096.55	\$9,401.46	23,187.36		111,042.76
	67,976.93	\$54,033.83	211,298.27		1,146,704.82
Balance unexpended at end of month.	12,023.07	45,966.17	74,828.85		888,433.05
In Treasury United States.	18,427.19	11,360.89	95,047.46		831,623.62
In hand.	-6,404.12	34,606.28	-20,218.61		6,809.43
	12,023.07	45,966.17	74,828.85		838,433.05
Outstanding liabilities at end of month.	12,023.07	13,897.32	62,542.26		202,506.42
Amount covered by existing contracts at end of month.			24.00		253,949.66
	12,023.07	13,897.32	62,566.26		456,455.08
Balance available at end of month.		32,068.85	12,262.59		381,977.97

¹ Longwood, Miss., \$157,010.28; Lake Providence Reach, \$3,936,957.46; stone, third district, \$503,949.18; Vaucluse, Ark., \$153,517.17; Leland Neck, Ark., \$198,830.72; survey, east bank, Mississippi River, Brunswick to Warranton, Miss., \$6,936.59; Beulah Crevasse, \$550,000; Arkansas River levees, \$50,000; Albenmarie Bend, \$594,819.14; Grand Lake, Ark., \$159,456.47; Greenville, Miss., \$1,299,801.88; Delta Point, La., \$23,173.37.

² Amount, \$120,000, previously reported reduced \$20,090, by transfer to allotment for "Plant." Approved by Assistant Secretary of War, June 28, 1917. (ED 15927-525.)

³ Amount, \$266,037.12, previously reported, increased \$20,090, as follows: \$90.00 by sale of condemned barges, June 13, 1917, and \$20,000 by transfer from allotment for "Repairs to existing works and stone." (ED 15927-525.)

⁴ Amount, \$138,440.11, previously reported, reduced \$329.20, as follows: \$12.50 refundment of overpayment on voucher No. 139, May, 1917, and \$316.70 transferred from office of secretary, Mississippi River Commission, on books of office, Chief of Engineers, under date of June 21, 1917, for coal furnished the secretary's office. (ED 24722-29 and 31.)

⁵ Includes \$68.99 in Treasury settlements, as follows: No. 28488, for \$40.40; No. 28416, for \$22.86; and No. 28826, for \$25.63.

⁶ Includes \$3,068.31, part of Treasury settlement No. 28650, for freight service.

⁷ Distributed as follows: Filters Bend, \$45,379.07; Greenville, Miss., \$877.91; Vaucluse, Ark., \$1,509.96; Albenmarie Bend, Miss., \$7.35, and stone, third district, \$6,259.54.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1917—Continued.

THIRD DISTRICT—Continued.

Appropriations.	Yazoo River and tributaries, Miss., Yazoo River, at mouth.	Appropriation for damages by collision, river and harbor works (claim of Miller Engineering Co).	Expended appropriations.	Grand total.
Amount expended on present project to end of last fiscal year.....	\$1,245,277.78	.....	\$611,604.43	\$28,756,023.41
Balance unexpended at end of last fiscal year.....	* 14,722.52	.....	.....	929,201.03
Amount appropriated or allotted since (net).....	\$47.98	.....	1,999,911.40
.....	47.98	.....	2,929,112.43
Amount expended from beginning of present fiscal year to end of previous month.....	47.98	.....	1,007,608.38
Amount expended during the month.....	47.98	.....	120,099.08
.....	47.98	.....	1,727,707.46
Balance unexpended at end of month.....	1,201,344.97
In Treasury United States.....	1,147,891.60
In hand.....	53,453.37
.....	1,201,341.97
Outstanding liabilities at end of month.....	235,130.51
Amount covered by existing contracts at end of month.....	392,553.22
.....	627,683.73
Balance available at end of month.....	573,661.24

* Maintaining and protecting levees of the Mississippi River and tributaries against floods (protection of levees, third district, \$170,616.32; protection of levees, Red River and tributaries, \$5,729.35), \$176,347.57; examinations, surveys, and contingencies of rivers and harbors (canal leading from Centennial Lake at Vicksburg, Miss., to the Mississippi River), \$2,000; rebuilding levees of the Mississippi River and tributaries damaged by floods (Lower Yazoo levee district, \$210,000; Upper Tensas levee district, \$415,000; Red River levees, \$8,251.51), \$633,256.56.

* Balance unexpended at end of last fiscal year, \$14,722.52, transferred Oct. 9, 1916, to district engineer officer, Vicksburg, Miss., district, under provision of river and harbor act of July 27, 1916. (ED 7716-38.)

FOURTH DISTRICT.

A appropriations: Mississippi River; maintenance and improvement of existing river and harbor works; emergencies in river and harbor works; maintaining and protecting levees of the Mississippi River and tributaries against floods; removing sunken vessels or craft obstructing or endangering navigation; rebuilding levees of the Mississippi River and tributaries damaged by floods.]

Appropriations.	Maintenance and improvement of existing river and harbor works, act of Oct. 2, 1914, allotment for—				
	Lower Tensas levee district.	Atchafalaya levee district.	Pontchartrain levee district.	Kempe Bend re-vestment.	Marengo Bend.
Amount expended on present project to end of last fiscal year.....	\$205,373.40	\$86,329.76	\$75,555.49	\$60,024.00	\$219.57
Balance unexpended at end of last fiscal year.....	69,626.60	38,670.24	24,444.51	228.96	4,780.43
Amount expended from beginning of present fiscal year to end of previous month.....	48,643.02	38,670.24	24,444.51	228.96	4,780.43
.....	20,983.58	.....	.....	.....	.....
Balance unexpended at end of month.....	20,983.58	.....	.....	.....	.....
In hand.....	20,983.58	.....	.....	.....	.....
Balance available at end of month.....	20,983.58	.....	.....	.....	.....

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1917—Continued.

FOURTH DISTRICT—Continued.

Appropriations.	Maintenance and improvement of existing river and harbor works, act of Oct. 2, 1914, allotment for—			
	Natches front.	General repairs, and stone.	Expended allotments.	Total.
Amount expended on present project to end of last fiscal year.....	\$11, 118.54	(1)	* \$406, 525.65	\$635, 141.41
Balance unexpended at end of last fiscal year.....	886.46	.....	.....	138, 637.20
Amount expended from beginning of present fiscal year to end of previous month.....	663.64	.....	.....	117, 460.80
Balance unexpended at end of month.....	192.82	.....	.....	21, 176.40
In hand.....	192.82	.....	.....	21, 176.40
Balance available at end of month.....	192.82	.....	.....	21, 176.40

Appropriations.	Maintenance and improvement of existing river and harbor works, act of Mar. 4, 1915, allotment for—					
	Surveys.	Lower Tensas levee district.	Atchafalaya levee district.	Lafourche levee district.	Barataria levee district.	Pontchartrain levee district.
Amount expended on present project to end of last fiscal year.....	\$2, 076.20	\$97, 827.25	\$24, 430.42	\$10, 198.54	\$46, 633.87	\$6, 152.82
Balance unexpended at end of last fiscal year.....	5, 923.80	161, 719.75	61, 885.18	15, 529.46	15, 602.13	33, 951.18
Amount appropriated or allotted since (net).....	19.25	260.00	12.00	11.08	.....	13.50
.....	5, 943.05	161, 979.75	61, 897.18	15, 540.54	15, 602.13	33, 964.68
Amount expended from beginning of present fiscal year to end of previous month.....	2, 615.12	48, 097.30	25, 037.98	15, 540.54	15, 602.13	33, 097.76
Amount expended during the month.....	2, 615.12	1, 840.09	.....	.....	.....	.....
.....	2, 615.12	49, 737.39	25, 037.98	15, 540.54	15, 602.13	33, 097.76
Balance unexpended at end of month.....	3, 327.93	112, 242.36	36, 859.20	.....	.....	866.93
In Treasury United States.....	2, 519.25	96, 180.06	21, 327.60	.....	.....	117.60
In hand.....	808.68	16, 062.30	15, 531.60	.....	.....	749.42
.....	3, 327.93	112, 242.36	36, 859.20	.....	.....	866.93
Amount covered by existing contracts at end of month.....	.....	112, 242.36	33, 997.17	.....	.....	.....
Balance available at end of month.....	3, 327.93	.....	2, 862.03	.....	.....	866.93

¹ Amount, \$6,848.35, expended during the fiscal year 1916, distributed to following works: Harbor at New Orleans, La., \$4,529.13; Bondurant, \$2,319.22.

² Lafourche levee district, \$100,000; Barataria levee district, \$76,265; Lake Borgne levee district, \$75,000; Gills Bend, \$40,184.25; Plaquemine, La., \$80,000; plant, \$60,513.61; harbor at New Orleans, La., \$64,529.13; Atchafalaya and Red Rivers, La., \$15,000; Hard Times Bend, \$22,714.44; Bondurant, \$2,319.22.

*Consolidated statement of condition of appropriations and allotments under
Mississippi River Commission on June 30, 1917—Continued.*

FOURTH DISTRICT—Continued.

Appropriations.	Maintenance and improvement of existing river and harbor works, act of Mar. 4, 1915, allotment for—					
	Lake Borgne levee district.	Hard Times Bend.	Kempe- Bend revet- ment.	Plaque- mine, La., revet- ment.	General repairs, and stone.	Plant.
Amount expended on present project to end of last fiscal year.....	\$25,643.66	\$96,934.39	\$785.41	\$26,525.33	(1)	\$90,257.20
Balance unexpended at end of last fiscal year.....	15,362.34	29,065.61	19,214.59	3,474.67	\$19,805.29	15,552.80
Amount appropriated or allotted since (net).....						2,378.69
Amount expended from beginning of present fiscal year to end of previous month.....	15,362.34	29,065.61	19,214.59	3,474.67	19,805.29	17,931.49
Balance unexpended at end of month.....	15,362.34	24,065.60	19,213.02	1,859.85	\$15,231.11	17,931.49
In Treasury United States.....		5,000.01	1.57	1,614.82	4,574.18	
In hand.....		4,459.46	1.57	1,614.82	98.06	
Balance available at end of month.....		540.55		4,476.12		
		5,000.01	1.57	1,614.82	4,574.18	

Appropriations.	Maintenance and improvement of existing river and harbor works, act of Mar. 4, 1915, allotment for—				
	Harbors at Natchez and Vidalia, Miss. and La.	Harbor at New Orleans, La.	Atchafalaya and Red Rivers, La.	Expended allotments.	Total.
Amount expended on present project to end of last fiscal year.....	\$130,620.00	\$23,433.80	\$12,799.19	\$52,192.49	\$586,510.57
Balance unexpended at end of last fiscal year.....	64,014.00	21,048.42	7,200.81		492,900.03
Amount appropriated or allotted since (net).....		2,391.36			5,085.88
	64,014.00	27,079.78	7,200.81		498,075.91
Amount expended from beginning of present fiscal year to end of previous month.....	64,014.00	6,744.09	7,033.66		311,446.59
Amount expended during the month.....	64,014.00	6,744.09	7,033.66		1,640.00
Balance unexpended at end of month.....		20,335.09	167.15		313,086.68
In Treasury United States.....		15,331.77	167.15		181,989.23
In hand.....		5,003.32			140,180.85
		20,335.09	167.15		44,808.38
Amount covered by existing contracts at end of month.....					184,990.23
Balance available at end of month.....					146,239.53
		20,335.09	167.15		38,740.70

¹ Amount, \$5,194.71, expended during the fiscal year 1916, distributed to following works: Harbor at New Orleans, La., \$3,002.22; Bondurant, \$2,192.49.

² Distributed as follows: Harbor at New Orleans, La., \$7,497.42; Marengo Bend, \$3,462.02; Giles Bend, \$4,271.67.

³ Bondurant, \$2,192.49.

*Consolidated statement of condition of appropriations and allotments under
Mississippi River Commission on June 30, 1917—Continued.*

FOURTH DISTRICT—Continued.

Appropriations.	Mississippi River, allotment for—				
	Surveys, gages, and observa- tions.	Lower Tensas Levee district.	Atchafalaya Levee district.	Lafourche Levee district.	Barataria Levee district.
Amount expended on present project to end of last fiscal year.....	\$150,165.52	\$4,738,205.68	\$2,003,434.50	\$890,769.14	\$675,163.95
Balance unexpended at end of last fiscal year.....			40,701.42		
Amount appropriated or allotted since (net).....	¹ 5,008.10	² 324,002.50	³ 150,001.25	100,000.00	95,000.00
	5,008.10	324,002.50	190,702.67	100,000.00	95,000.00
Amount expended from beginning of present fiscal year to end of previous month.....	515.27	35,193.62	40,015.63	15,965.43	26,149.74
Amount expended during the month.....		3,519.62	8,427.09	4,179.10	706.71
	515.27	38,713.24	48,442.72	20,144.53	26,856.45
Balance unexpended at end of month.....	4,490.83	285,289.26	142,259.95	79,855.47	68,143.55
In Treasury United States.....	4,006.10	286,002.50	148,830.19	78,999.11	64,009.63
In hand.....	484.73	—713.24	—6,570.24	856.36	4,133.92
	4,490.83	285,289.26	142,259.95	79,855.47	68,143.55
Outstanding liabilities at end of month.....	767.42	70,369.24	327.45	4,568.86	528.99
Amount covered by existing contracts at end of month.....		62,755.14	112,229.39	47,427.96	
	767.42	133,124.38	112,556.84	51,996.82	528.99
Balance available at end of month.....	3,723.41	152,164.88	29,703.11	27,858.65	67,614.56

¹ Amount, \$5,000, previously reported increased \$6.10, received from sale of blue prints.² Amount, \$324,000, previously reported increased \$2.50, received from sale of blue prints.³ Amount, \$150,000, previously reported increased \$1.25, received from sale of blue prints.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1917—Continued.

FOURTH DISTRICT—Continued.

Appropriations.	Mississippi River, allotment for—				
	Homo-chitto Levee district.	Pontchar-train Levee district.	Lake Borgne Levee district.	Hard Times Bend.	Bondurant.
Amount expended on present project to end of last fiscal year.....	\$2,508.89	\$2,062,594.30	\$609,561.11	\$145,000.00	\$78,500.00
Balance unexpended at end of last fiscal year.....	493.71				
Amount appropriated or allotted since (net).....		125,000.00	50,000.00	100,000.00	35,000.00
	493.71	125,000.00	50,000.00	100,000.00	35,000.00
Amount expended from beginning of present fiscal year to end of previous month.....		22,916.03	10,450.39	28,632.99	11,644.96
Amount expended during the month..		6,828.08	2,525.75	644.50	214.88
		29,744.11	12,976.14	29,277.49	11,859.84
Balance unexpended at end of month.....	493.71	95,255.89	37,023.86	70,722.51	23,140.16
In Treasury United States.....	2.35	92,000.00	32,007.50	60,000.00	12,000.00
In hand.....	491.36	5,255.89	5,016.36	10,722.51	11,140.16
	493.71	95,255.89	37,023.86	70,722.51	23,140.16
Outstanding liabilities at end of month.....		3,708.13	2,908.89	4,992.72	3,650.63
Amount covered by existing contracts at end of month.....		60,821.00		39,890.03	
		64,529.13	2,908.89	44,982.75	3,650.63
Balance available at end of month	493.71	30,726.76	34,114.97	25,839.76	19,489.64

Appropriations.	Mississippi River, allotment for—				
	Kempe Bend revetment.	Giles Bend.	Marengo Bend.	Grand Bay.	General repairs, and stone.
Amount expended on present project to end of last fiscal year.....	\$1,295,000.00				\$45,000.00
Amount appropriated or allotted since (net).....	65,000.00	110,000.00	90,000.00	\$175,000.00	23,000.00
Amount expended from beginning of present fiscal year to end of previous month.....	35,024.65	38,471.01	54,657.53	141,090.75	9,186.94
Amount expended during the month..	135.77	318.79	131.36	1,474.78	
	35,160.42	38,789.80	54,788.89	142,565.51	9,186.94
Balance unexpended at end of month.....	29,839.58	71,210.20	35,211.11	32,434.49	13,813.06
In Treasury United States.....	25,000.00	54,997.23	25,000.00	30,000.00	8,000.00
In hand.....	4,839.58	16,212.97	10,211.11	2,434.49	5,813.06
	29,839.58	71,210.20	35,211.11	32,434.49	13,813.06
Outstanding liabilities at end of month.....	3,677.97	4,165.66	2,511.84	432.06	730.63
Amount covered by existing contracts at end of month.....	1,601.42				
	5,279.39	4,165.66	2,511.84	432.06	730.63
Balance available at end of month	24,560.19	67,044.54	32,699.27	32,002.43	12,082.44

¹ Includes \$0.277 in Treasury Settlement No. 28487, May 23, 1917, for freight service in February, 1917.² Distributed as follows: Harbor at New Orleans, La., \$2,186.94; Plaquemine, La., revetment, \$6,000.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1917—Continued.

FOURTH DISTRICT—Continued.

Appropriations.	Mississippi River, allotment for—				
	Plant.	Harbor at New Orleans, La.	Atchafalaya and Red Rivers La.	Expended general allotments.	Expended specific allotments.
Amount expended on present project to end of last fiscal year.	\$1,193,494.82	\$1,090,951.00	\$135,453.95	\$1,938,418.42	\$2,298,066.65
Amount appropriated or allotted since (net).....	166,029.00	\$ 133,317.28	15,000.00	.....	.....
Amount expended from beginning of present fiscal year to end of previous month.....	120,143.98	16,453.43	14,898.03	.....	.....
Amount expended during the month.....	16,300.88	4,931.37	45.63	.....	.....
	\$ 145,444.86	21,384.80	14,943.66	.....	.....
Balance unexpended at end of month.....	20,584.14	111,932.48	56.34	.....	.....
In Treasury United States.....	18,384.76	110,126.86	.....	.....	.....
In hand.....	2,199.38	1,805.62	56.34	.....	.....
	20,584.14	111,932.48	56.34	.....	.....
Outstanding liabilities at end of month.....	19,207.22	8,724.74	10.25	.....	.....
Balance available at end of month.....	\$ 1,376.92	103,207.74	46.09	.....	.....

¹ Preservation of works, \$134,000; Plaquemine, La., revetment, \$150,000; Reid-Bedford Bend, \$37,404.63; dredges and dredging, \$2,506.99; Natchez and Vidalia Harbors, Miss., and La., \$1,564,506.80.

² Improving harbors at Natchez and Vidalia, Miss. and La., \$282,252.04; improving harbor at New Orleans, La., \$379,632.86; improving Atchafalaya and Red Rivers, La., \$1,001,709.40; survey east bank of Mississippi River from Warrenton to Baton Rouge, \$4,465.35.

³ Amount, \$133,316.80, previously reported increased 48 cents, received from sale of blue prints.

⁴ Includes \$13,820.62, reimbursable from other districts.

⁵ Does not include \$13,820.62, reimbursable from other districts.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1917—Continued.

FOURTH DISTRICT—Continued.

Appropriations	Total.	Removing sunken vessels or craft obstructing or endangering navigation; indefinite. ¹	Expended appropriations.	Grand total.	Expended contributed funds.
Amount expended on present project to end of last fiscal year...	\$19,252,287.93	\$6.11	\$416,575.30	\$21,190,521.32	\$34,921.02
Balance unexpended at end of last fiscal year.....	41,195.13	7,993.89	.....	690,816.25	.....
Amount appropriated or allotted since (net).....	1,761,356.13	.....	.....	1,766,442.01	.....
	1,802,551.26	7,993.89	.....	2,447,258.26	.....
Amount expended from beginning of present fiscal year to end of previous month.....	630,410.38	7,993.89	.....	1,067,311.66	.....
Amount expended during the month.....	50,384.29	.....	.....	52,024.38	.....
	680,794.67	7,993.89	.....	1,119,336.04	.....
Balance unexpended at end of month.....	1,121,756.59	.....	.....	1,327,922.22	.....
In Treasury United States.....	1,049,366.23	.....	.....	1,187,547.08	.....
In hand.....	72,390.36	.....	.....	138,375.14	.....
	1,121,756.59	.....	.....	1,327,922.22	.....
Outstanding liabilities at end of month.....	131,282.58	.....	.....	131,282.58	.....
Amount covered by existing contracts at end of month.....	324,724.94	.....	.....	470,964.47	.....
	456,007.52	.....	.....	602,247.05	.....
Balance available at end of month.....	665,749.07	.....	.....	725,675.17	.....

¹ Removing wreck of bark Santos Amaral.² Emergencies in river and harbor works (for Giles Bend, Miss., \$40,000; for Old River, \$10,000), \$50,000. Maintaining and protecting levees of the Mississippi River and tributaries against floods (fourth district, \$141,786.32; Atchafalaya River and Bayou des Glaises, \$31,431.05), \$173,217.37. Removing sunken vessels or craft obstructing or endangering navigation, \$1,500. Rebuilding levees of Mississippi River and tributaries damaged by floods (Lower Tensas levee district, \$6,985.66; Lafourche levee district, \$105,318.56; Lake Borgne levee district, \$551.96; east bank Mississippi River from Vicksburg to Bayou Sara, \$23,402.56; sundry breaks Bayou des Glaises and Atchafalaya River, \$55,539.19), \$191,857.93.³ Funds contributed for improvement of Mississippi River at Avondale, La., \$32,467.28; funds contributed for improvement of Mississippi River at Torras, La., \$2,453.74.

APPENDIXES ACCOMPANYING THE ANNUAL REPORT OF THE MISSISSIPPI RIVER COMMISSION, FOR THE FISCAL YEAR ENDING JUNE 30, 1917.

Appendix 1.

Report of Maj. Clarke S. Smith, Corps of Engineers, United States Army, secretary, Mississippi River Commission, on works in his charge (13 plates)-----	Page. 3461
--	---------------

Appendix 2.

Report of Lieut. Col. G. P. Howell, Corps of Engineers, United States Army, on operations in first and second districts (22 plates)-----	3505
--	------

Appendix 3.

Report of Maj. J. R. Slattery, Corps of Engineers, United States Army, on operations in third district (13 plates)-----	3553
---	------

Appendix 4.

Report of Lieut. Col. G. Mc. Derby, United States Army, on operations in fourth district (13 plates)-----	3595
---	------

Appendix 5.

Topical index to annual report of the Mississippi River Commission for 1917-----	3657
--	------

APPENDIX 1.

IMPROVEMENT MISSISSIPPI RIVER IN CHARGE OF THE SECRETARY, MISSISSIPPI RIVER COMMISSION.

REPORT OF MAJ. CLARKE S. SMITH, CORPS OF ENGINEERS, UNITED STATES ARMY, SECRETARY MISSISSIPPI RIVER COMMISSION, OFFICER IN CHARGE, FOR THE YEAR JUNE 1, 1916, TO MAY 31, 1917:

IMPROVEMENTS, ETC.

1. Mississippi River Commission.
2. Surveys, gauges, and observations.
3. Dredges and dredging.
4. Levees, Cape Girardeau, Mo., to Rock Island, Ill.

1. MISSISSIPPI RIVER COMMISSION.

The duties of the secretary under this allotment consist in payment of salaries and clerical, office, mileage, and miscellaneous expenses of the Mississippi River Commission; in the publication of the official reports and defraying the expenses of the semiannual and other trips of the commission, and the care and repair of the steamer *Mississippi*.

The Mississippi River Commission held four sessions during the year. The one hundred and thirty-fifth and one hundred and thirty-sixth sessions were held in St. Louis, Mo.; the one hundred and thirty-seventh on the United States steamer *Mississippi* from Rock Island, Ill., 510 miles above Cairo, to New Orleans, La., 967 miles below Cairo; and the one hundred and thirty-eighth on the steamer *Mississippi* from St. Louis, Mo., 191 miles above Cairo, to New Orleans, La.

The proceedings of these sessions and monthly reports of operations have been printed and issued.

Preliminary drawings and specifications of a new inspection steamer were completed.

For expenditures see money statements, pages 3439-3442.

2. SURVEYS, GAGES, AND OBSERVATIONS.

Location and description.—This work covers the Mississippi River from Head of Passes to the headwaters at Lake Itasca, a distance by river of 2,460 miles. The tributaries and Gulf coast at various places are also included for gages and observations. Surveys are made of the Mississippi River when ordered by the commission. Discharge measurements are made annually at all of 11 gaging stations on the Mississippi River and 11 stations on tributaries, at which river stages prescribed by the commission are reached during the year.

Original condition.—Lack of surveys and physical data made studies of the river incomplete.

Previous projects.—Various surveys and examinations have been made and maps published covering portions of the rivers in this district, but no comprehensive project had been adopted previous to the present one.

Existing project.—The existing project was adopted by act approved June 28, 1879, which reads in part as follows:

"Sec. 3. It shall be the duty of said commission to direct and complete such surveys of said river, between the Head of the Passes, near its mouth, to its headwaters, as may now be in progress and to make such additional surveys, examinations, and investigations—topographical, hydrographical, and hydro-metrical—of said river and its tributaries as may be deemed necessary; * * *."

Operations and results during the year.—The scientific records, maps, and construction drawings of the secretary's office have been catalogued and card indexed. The usual large number of requests for data of the Mississippi River have been complied with. A contract for printing maps was entered into, and the work was begun on printing maps of the resurvey of the Mississippi River, between high-water banks, from Cairo, Ill., to the mouth of Red River, La., a distance of 772 miles by river. This survey will be shown on 23 maps, scale 1 inch=1 mile, and on 63 detail charts, scale 1:20,000.

The printing of the annual pamphlet for the calendar year 1915, *Stages of the Mississippi River and of its Principal Tributaries*, in progress at last report, was completed; and this pamphlet for the calendar year 1916, now being printed, is 90 per cent completed.

The computation of discharge measurements taken during the year 1916 was completed and is now in progress on the discharge measurements taken during the high water of 1917.

The hourly readings for the calendar years 1915 and 1916 were scaled and tabulated from the rolls of the automatic tide gauges at Biloxi, Miss., and East Bay, La.

The hydrographs of the Mississippi River and tributaries for 1916 are being prepared in four sheets for blue printing. A hydrograph of the Mississippi River from Cairo, Ill., to Fort Jackson, La., for the period June 1, 1916, to May 31, 1917, is herewith, designated as plate 1.

The 185 high-water gauges on the Mississippi River from Cairo, Ill., to Head of Passes, La., were read during the high water March to May, 1917. The highest readings during the year on the regular and high-water gauges from Cairo to Head of Passes have been reduced to height above mean Gulf level and are given herewith in Table No. 3. The profile of the high water of 1917 from Cairo to Head of Passes has been plotted and is herewith, designated as plate 2.

The 38 regular gauges in charge of this office on the Mississippi River and tributaries have been inspected and maintained during the year. Continuous daily readings on these gauges have been observed and reported, and the readings have been tabulated and plotted on the office hydrographs. The automatic tide gauges at Biloxi, Miss., and East Bay, La., and the 185 high-water gauges on the Mississippi River from Cairo, Ill., to Head of Passes, La., have been inspected and maintained during the year.

The discharge of the Mississippi River was measured during the high water of 1917 at Columbus, Ky. (21 miles below Cairo), March 23 to 28; at Friar Point, Miss. (318), March 28 to April 14; at Chicot City, Ark. (432), April 2 to 18; at Vicksburg, Miss. (600), April 17 to 25; at Red River Landing, La. (705), and vicinity, including Atchafalaya River at Simmesport, La., and Old River at Torras, La., April 11 to 25; and at Carrollton, La. (957), April 24 to 30.

The high-water discharge of tributaries was measured during 1917 on the Cumberland River at Nashville, Tenn., 191 miles from the mouth, March 9 to 13; on the Tennessee River at Riverton, Ala., 225 miles from the mouth, March 12 to 16; on the Yazoo River at Redwood, Miss., 18 miles from the

mouth, April 22; and on the Black River at Jonesville, La., 54 miles from the mouth, April 27.

Overflow water on the right bank of the Mississippi River, passing between Arkansas City, Ark. (438), and Trippe, Ark., was measured May 2, 1917.

Precise levels were run connecting the nearest precise-level bench marks with the gauges at Plaquemine, Donaldsonville, and Bayou Sara, La.

In compliance with a provision of the river and harbor act of July 27, 1916, a survey was made of the Atchafalaya River from its head at Red River to Morgan City, La., including the main bayous and lakes between Grand River on the east and Grand Prairie on the west.

The field work of this survey was begun at Barbre Landing, La., October 28, 1916, by a party of 40, in charge of Junior Engineer H. R. Andress, and was completed March 24, 1917. The outfit used on this survey consisted of the steamer *Venus*, office and survey boat No. 5, 1 fuel barge, 2 motor boats—*Bolivar* and *Obion*, and 10 skiffs.

Condition at the end of year.—The general survey was completed in 1904, and maps have been published covering the entire river. Special surveys have been made of the lower river between the mouth of the Ohio River and Carrollton, La. (1957), to determine changes in bank line and section; between Cairo, Ill., and Donaldsonville, La. (885), to determine the amount of bank erosion; and at various other localities for the collection of physical data. The survey for the restoration of the permanent marks of the general survey below Cairo, which was begun at Cairo in the fall of 1905, was completed to Donaldsonville, La., base line, 890.5 miles below Cairo, in January, 1910. A resurvey of the river between high-water banks from Cairo to mouth of Red River, a distance of 772 miles by river, begun at Cairo in 1911, was completed in January, 1914. Surveys were completed in February, 1914, in the vicinity of New Orleans, La., in connection with proposed spillways, to reduce flood heights. A survey of the Atchafalaya River, from Barbre Landing to the junction of the Little Atchafalaya and upper Grand Rivers, was made in 1904-1905. The field work of a survey of the Atchafalaya River, from its head to Morgan City, La., was completed in 1916-17. Gauges have been established and maintained at various places on the Mississippi River and tributaries and the Gulf of Mexico and the readings published. Discharge and other observations have been made on the Mississippi River and tributaries at various stations and the results published in part. Physical data have been compiled and card indexed. Printing maps, scale 1 inch=1 mile, and detail charts, scale 1:20,000, of the resurvey from Cairo, Ill., to the mouth of Red River, La., and reprinting charts and maps the supply of which is almost exhausted is in progress. The gauges are being maintained; computation of discharge measurements made in 1917 and printing of pamphlet, "Stages of the Mississippi River and its Principal Tributaries during 1916," are in progress.

Local cooperation.—None.

Effect of work.—The surveys, gauge readings, and other observations made and now being made furnish valuable data for the study of the river in formulating and perfecting plans for improvement.

Proposed operations.—It is proposed to publish the maps and charts now ready for publication, maintain gauges, make discharge and other observations, continue the collection and compilation of physical data, and make such other surveys and observations as may from time to time be ordered by the commission.

For expenditures see money statements, page 3441.

3. DREDGES AND DREDGING.

Location.—The portion of the Mississippi River included in this district for dredging extends over about 1,006 miles of river, from the mouth of the Ohio River to Head of Passes, La. The lower end of the district is 13½ miles from the Gulf of Mexico by South Pass and 19½ miles by Southwest Pass.

Original condition.—Depths of 5 and 5½ feet prevailed during low water on crossings in the upper portion of this district before operations were begun by the United States. Below the mouth of Red River the channel depths were ample for the requirements of navigation to the lower limits of this district.

Previous projects.—There had been no project for dredging by the United States in this district previous to the existing project.

Existing project.—The existing project was defined in the river and harbor act of June 3, 1896, carrying the first appropriation for this work, which was to be expended as follows:

" * * * In the construction of suitable dredge boats and other devices and appliances and in the maintenance and operation of the same, with the view of ultimately obtaining and maintaining a navigable channel from Cairo down, not less than two hundred and fifty feet in width and nine feet in depth at all periods of the year except when navigation is closed by ice. * * * "

Operations and results during the year.—During the low-water season of 1916, four dredges—the *Gamma*, *Iota*, *Kappa*, and *B. M. Harrod*—were operated at 12 crossings from Foot of Toney's Chute, 78 miles below Cairo, to Cat Island, 256 miles below Cairo.

The first bar to require dredging was Bullerton (167). Only a small amount of dredging was done, August 15 to 17, when a rise in the stage rendered further work unnecessary.

At the beginning of August the Cairo gauge registered 26 feet, with a rapid and continued fall indicated. The *Kappa* and *Harrod* were prepared for service and after an inspection trip developed that the bars in some of the crossings were unusually high these two dredges were started up the river on August 9 and 11, respectively, the *Kappa* for Bullerton and the *Harrod* for Toney's.

A rise which commenced on August 11 at Cairo maintained project depths during the remainder of August. At the close of the month, however, the stage was falling rapidly, and there was no further material rise until late in December.

A low stage of 9.7 feet on the Cairo gauge and 6.4 feet on the Memphis gauge was reached late in September. The minimum for the season was 5.8 feet at Cairo and 2.8 feet at Memphis, on December 25 and 28, respectively.

The work performed by each dredge and place at which dredging was done is given in Table No. 7, accompanying.

The total amount of material moved by all these dredges during the season was 1,590,378 cubic yards.

Seventeen inspection trips were made with the steamer *Inspector M. R. C.* over stretches of the river from Head of Toney's Chute, 76 miles below Cairo, to Memphis, 230 miles below Cairo, and 13 inspection trips were made from Memphis to Cat Island, 256 miles below Cairo.

The least depths found at the various crossings are given in Table No. 5, accompanying.

Seventy-two surveys were made of 21 shoal crossings between Medleys, 30 miles below Cairo, and Angola and Smithland, 765 miles below Cairo. These surveys were made by parties on the survey boats *Mercury* and *Saturn*, and were for use primarily in connection with dredging operations. The dimensions of channels determined from these surveys are given in Table No. 6, accompanying.

The following is a brief description of the operations of each dredge, followed by a statement of conditions prevailing and results obtained at each of the bars where dredging was done during the low-water season of 1916.

Dredging operations—Dredge "Gamma."—The *Gamma* was placed in commission and left the dredge fleet (232) at 1.45 p. m., September 11, for Yankee Bar Crossing (170). It arrived at the crossing on the 15th at 7.50 a. m., commenced dredging at 3.20 p. m., and continued until 11.25 p. m. on the 19th, a satisfactory channel having been completed. The material encountered was blue mud with some sand.

The *Gamma* left Yankee Bar Crossing at 11.25 a. m., September 20, arrived at the crossing at the Foot of Island 26 (153) at 3.25 p. m. on the same day, and began dredging at 5 p. m. Dredging in that crossing was discontinued at 12 p. m. on the 25th, on account of a cracked flange on the copper main steam pipe to the high-pressure cylinder of the pumping engine. The work in this crossing was completed by the dredge *Kappa*.

The *Gamma* was taken to the dredge fleet for repairs, arriving there at 1.50 p. m., September 28, and was used there October 5 to 13 to remove a deposit of sand from the tracks of the marine railway dry docks. On October 20 the *Gamma* was moved to the mouth of Wolf River (229), and the crew was used on the construction of a dam in Wolf River below the head of the canal, while the dredge was awaiting a lower stage.

The *Gamma* was moved to the dredge fleet (232) December 4 to obtain coal, and left at 3.10 p. m. on the 5th for Yankee Bar Crossing (170), where it arrived at 1.30 p. m. on the 7th. Dredging in this crossing was commenced at 3.40 p. m. on the 7th and discontinued at 5.15 a. m. on the 8th, on account of a cracked flange in the main steam pipe to the pumping engine. The dredge was moved to Luxora, Ark. (161), on December 9, pending completion of repairs. It left Luxora on account of heavy running ice at 11.40 a. m. December 21, arrived at the dredge fleet at 12.20 p. m. on the 22d, and was withdrawn from commission December 23.

Dredge "Iota."—The *Iota* was withdrawn from work in Memphis Harbor (230) September 2, and was moved to the dredge fleet (232) to be prepared for river-channel work. The dredge left the dredge fleet at noon September 4 and arrived at Coahoma Crossing (248) at 2.30 p. m. Dredging in this crossing was commenced 3.50 p. m. on the 5th and was completed at 5 a. m. on the 8th, and the dredge was moved to the bank to await a lower stage.

On September 19 the dredge was moved out on the crossing to reopen a channel through a reef at the lower end of the crossing. While maneuvering into position the dredge was grounded and was not released until assisted by a pile sinker sent from the dredge fleet. The dredge was tied up at Coahoma, Miss. (248), at 11.30 a. m. on the 21st to wash boilers.

The *Iota* left Coahoma at 1.20 p. m., September 23, and arrived at Cat Island Crossing (256) at 4.30 p. m. Dredging was commenced in this crossing at 2.10 p. m. on the 24th and continued until 9.50 a. m. on the 26th. The dredge was moved to the bank and tied up to await a lower stage. The material encountered in this crossing was sand with a small amount of gravel. The depth of channel was increased from $7\frac{1}{2}$ to $10\frac{1}{2}$ feet.

The *Iota* remained at the bank at Cat Island Crossing (256) until 6.05 a. m., November 26, when it departed for the dredge fleet (232), arriving at 7.50 p. m. on the same day. No further dredging being required of this dredge, it was withdrawn from commission December 6, 1916.

Dredge "Kappa."—The *Kappa* was placed in commission and left the dredge fleet (232) at 5.30 a. m. August 9, and arrived at Drivers Landing (169), where it landed to clean boilers, at 2.20 p. m. on the 11th. The dredge left Drivers Landing at 7.30 a. m. on the 13th, taking the pontoons to Bullerton Crossing (167). On account of trouble with the refrigerating plant, it was necessary to go to Osceola, Ark. (165), for ice. The dredge then returned to Drivers Landing, took the coal barge in tow which had been left there on account of the swift current, and arrived at Bullerton Crossing (167) at 5 p. m. August 13. Dredging was commenced in this crossing at 8.30 a. m. on the 15th, and was discontinued at 6.30 p. m. August 17, on account of the rising stage. The dredge moved up to Osceola Bar (164) on the 18th and remained there awaiting a lower stage until 8 a. m. August 20, when it departed for River Styx Crossing (139), arriving there at 9.50 a. m. August 27. Dredging in this crossing was commenced at 2.20 p. m. on the 27th and was continued until 11.30 a. m. September 1.

The *Kappa* was then moved to Round Lake Crossing (159), arriving there at 6 p. m. September 1. After cleaning boilers, dredging in that crossing was commenced at 3.15 p. m. on the 5th and continued until noon on the 9th, when the entire crew of firemen quit. A new crew was obtained and dredging was resumed on the 12th. An excellent channel through this crossing was completed at 5 p. m. September 17, and the dredge was moved to the bank to make repairs to the boilers while awaiting a lower stage.

These repairs were completed on the 26th and the *Kappa* was taken to Island 26 Crossing (153) to finish the work begun by the *Gamma*. Work in that crossing was completed at 5.30 a. m., September 29, and resulted in an excellent channel.

On September 29 the *Kappa* assisted the steamer *Inspector* in releasing two barges of coal which had been grounded in Round Lake Crossing (159). The dredge was then moved to the bank at Luxora, Ark. (161), to clean boilers and await a lower stage.

The *Kappa* was taken to Yankee Bar Crossing (170), October 4; dredging was commenced there at 6.05 a. m. on the 5th and was completed at 9.05 p. m. on the 7th.

The *Kappa* left Yankee Bar Crossing at 6.50 a. m., October 8, and arrived at Luxora, Ark. (161), at 11 a. m., remaining there until 2.15 p. m. on the 11th. The dredge was then taken to Flower Island Crossing (171). On account of insufficient deck crew dredging was not begun there until 7.45 a. m. on the 12th. Dredging was suspended at 5.35 p. m. on the 13th to repair the home section of the discharge pipe. A section of the *Flad's* pipe line was received from the dredge fleet and dredging was resumed at 6.25 p. m. on the 17th. At 9.10 a. m. on the 18th, one of the couplings in the pipe line broke, allowing some sections to go adrift. These sections were recovered by the dredge and towed back to the crossing on the 19th. No further dredging was required in this crossing.

The *Kappa* was moved to Upper Yankee Bar Crossing (170), and dredging was commenced there at 6.35 p. m., October 19. Work in this crossing was completed at 11.10 p. m. on the 21st, and resulted in a very satisfactory channel

through an extremely bad stretch of river. The material encountered was sand, with some mud.

The *Kappa* was moved up to Luxora, Ark. (161), October 22, and remained there awaiting a lower stage until November 7, when it was moved to Round Lake Crossing (159). Dredging was commenced in that crossing at 8.45 p. m. on the 7th, and was completed at 11.25 a. m., November 10. The dredge was then moved to Luxora, Ark. (161), to await a lower stage.

The *Kappa* remained at Luxora until 9.10 a. m., November 29, when it left for the dredge fleet (232), arriving there at 11 a. m. on the 30th. This dredge was withdrawn from commission December 6.

Dredge "B. M. Harrod."—The *Harrod* was placed in commission and left the dredge fleet (232) at 11.50 a. m., August 11, 1918, for Point Pleasant, Mo. (80). On arrival at Caruthersville, Mo. (110), at 4.30 p. m. on the 13th, the dredge was coaled, and a barge of coal was taken in tow. The dredge left Caruthersville at 10.30 a. m., August 15, and arrived at Point Pleasant at 1.30 p. m. on the 16th. It remained at Point Pleasant awaiting a lower stage until 10 a. m. on the 30th. On that date it was moved up to Toney's Crossing (78), and dredging was commenced at 3 p. m. and continued until midnight September 2. The dredge was then moved to the bank to await a lower stage. The material encountered in this crossing was sand.

The *Harrod* was moved to Darnells Crossing (82), September 5, where dredging was commenced at 6 p. m. on that date, and completed at 5.15 a. m. on the 9th. The dredge then went to Caruthersville (110) for coal.

The *Harrod* left Caruthersville at 9.30 a. m. September 10, and arrived at Gayoso Crossing (104) at noon. Dredging in that crossing was commenced at 6.45 p. m. on the 10th, and a satisfactory channel was completed at 12.10 a. m. on the 13th. The dredge was then moved to Caruthersville to await a lower stage.

The *Harrod* left Caruthersville at 6.15 a. m., September 18, and arrived at Darnells Crossing (82) at 8.45 a. m. on the 19th. Dredging was commenced in that crossing at 9 a. m. on the 20th, and a satisfactory channel with a least depth of 12½ feet was completed at 10.20 a. m. on the 23d. The dredge was then moved to the bank at Williams Point Landing to await a lower stage at 10 a. m. on the 25th; it was moved out into Point Pleasant Crossing (80) and dredging was commenced at 2 p. m. An excellent channel was completed at 4 p. m., September 28.

The *Harrod* left the bank at Williams Point at 10.15 a. m., September 29, and was moved to Caruthersville (110), where it remained until October 12. At 7.45 a. m. on that date the dredge left for Darnells Crossing (82) and arrived there at 9.45 a. m. on the 13th. Dredging in this crossing was commenced at 4 p. m. on the 13th and was completed at 6.40 p. m., October 20. The dredge was then moved to the bank at Williams Point. A considerable amount of mud was encountered in Darnells Crossing.

The *Harrod* was moved from Williams Point out into Point Pleasant Crossing (80) at 10.45 a. m. October 24. Dredging was commenced at 1.45 p. m. on that date and continued until 1.30 a. m. on the 25th, when a flange bolt in the coupling of the main pump shaft broke. Repairs were completed and dredging was resumed at 10.45 a. m. on the 26th. A satisfactory channel in this crossing was completed at 9.45 p. m., October 26, and the dredge was moved to the bank on the 27th to await a lower stage.

The *Harrod* was again moved out into Darnells Crossing (82) at 1.30 p. m., November 8, and dredging was commenced at 8.30 p. m. on the 9th. Dredging to widen some narrow places in the channel was completed at 8.30 p. m. on the 9th. The dredge was moved to the coal fleet (108), November 10, to obtain coal and await a lower stage. It left the coal fleet December 21, and arrived at the dredge fleet (232) at 9.45 a. m. on the 24th. The *Harrod* was withdrawn from commission December 27.

On account of heavy ice running in the river, and official weather predictions that running ice would be much increased, the dredges were moved to the dredge fleet while the river was still at a low stage.

The rapid decline in the stage of the river, coming at the time when running ice prevented the operation of dredges, caused the depth on several of the crossings to be reduced to less than 9 feet. It is impossible, however, to combat conditions brought about by freezing of the upper river and heavy running ice below Cairo. After the ice had passed there were indications of an immediate rise, which would improve channel conditions before improvement

could be secured by dredging. All dredges remaining in commission were withdrawn December 27.

In 1910, under similar conditions, an attempt was made to continue the dredges in operation. No good results were secured, since, as in the present case, the freeing of the river of ice was accompanied by a rise.

A statement of the cost of dredging operations from May 1, 1916, to April 30, 1917, is given in Table No. 4, accompanying.

Notes on conditions and results of dredging at each crossing below Cairo during the low-water season of 1918—Toneys Chute, 78 miles below Cairo.—The channel which was made through Toneys Chute in 1915 by the dredge *Henry Flad* was very greatly widened during the high water of 1916, only one comparatively short shoal being left at the lower end of the chute. This shoal was dredged by the *Harrod* with excellent results, shown by a comparison of the maps of August 28 and September 4. A good channel was maintained through the entire season without further dredging.

Point Pleasant, 80 miles below Cairo.—This was a troublesome crossing, on account of the fact that the current divided on the head of a bar, a large volume flowing to the right of the bar and in to the bank below Point Pleasant Landing. The greater draft of water was to the left of the bar and out to a middle bar, where it made an abrupt turn to the right and back in to the bank, joining the upper current in the bend below Point Pleasant.

Dredging was first required only in that part of the channel leading out to the middle bar, but the caving of this bar caused a deposit in the lower crossing leading in to the bank, which also required dredging later. After this channel was opened no further dredging was required.

Darnells, 82 miles below Cairo.—Dredging was required four times to maintain a channel of project dimensions through this crossing. There were three distinct shoals, aggregating in length 5,500 feet. The first one developed at the upper end of the crossing early in September. Soon after the completion of a channel through this shoal it was necessary to extend the cut nearly 2,000 feet downstream. This, in connection with the first dredging, made a dredged channel 4,000 feet long and of project width.

On October 12 a shoal having developed in the bend at the extreme foot of the crossing, the *Harrod* was placed in position and commenced dredging a channel through this shoal.

Early in November it became evident that the upper end of the dredged channel was deteriorating and more work would be required to maintain project dimensions. On November 8, therefore, the *Harrod* was placed in position, and the channel was improved by widening and deepening at the extreme upper end of the crossing.

It was only by extreme vigilance and persistent dredging that a channel of project dimensions was maintained through Darnells Crossing throughout the low-water season.

Gayoso, 104 miles below Cairo.—An excellent channel was secured in this crossing by 2½ days' dredging by the *Harrod*, September 10 to 13.

River Stays, 139 miles below Cairo.—Five days' dredging by the *Kappa*, August 27 to September 1, was sufficient for the maintenance of the channel through this crossing.

Foot of Island No. 26, 153 miles below Cairo.—In the early part of the season the channel at the foot of Island 26 was close down by the foot of the island, but a survey made on September 6 showed indications of a new channel passing the foot of the island about one-half mile off. On September 17 this new channel had greatly improved from natural erosion and was selected for further improvement by dredging. Five days' dredging by the *Gamma*, September 20 to 25, and two days by the *Kappa*, September 27 to 29, completed an excellent channel, which required no further dredging during the low-water season.

Round Lake, 159 miles below Cairo.—Early in the season it was evident that Round Lake would give trouble, one reason being the large volume of water that was diverted through the Chute Island No. 80. Before dredging in Round Lake Crossing the channel through the chute was deeper by 2 feet than that through Round Lake Crossing.

As it was the desire of the commission to maintain a channel around by Loxora, if possible, the Round Lake Crossing was dredged, and in spite of the greater volume of water passing through the chute of Island 80, project depths of channel were maintained during the season. To accomplish this, however,

required nine days' dredging by the *Kappa* in September and three days in November.

Bullerton, 167 miles below Cairo.—A map platted from survey of September 8 and 9 discloses a network of narrow channels between bars, which made it evident that in any route selected for a crossing the channel would be shallow, narrow, and tortuous and obstructed by several shoals which would require dredging and could be maintained of project dimensions only with great difficulty.

The first dredging was required at a reef extending out from the foot of Yankee Bar, and was done by the *Gamma* about the middle of September. Three other distinct and separate shoals were later dredged—Middle and Upper Yankee Bar and Flower Island, the last at the extreme lower end of the crossing. Map of October 3 shows only 8½ feet in the Middle Yankee Bar Shoal. This condition existed only for a very few days before dredging by the *Kappa* October 5 to 7, and was caused by heavy caving at the head of Yankee Bar which dropped immense quantities of sand into the current to be deposited on reefs below.

Coahoma, 248 miles below Cairo.—Only a comparatively small amount of dredging was required in this crossing, although late in the season a new natural channel developed about three-fourths of a mile above the dredged cut and the dredged channel filled up.

Cat Island, 256 miles below Cairo.—Channel depths in this crossing were less than project requirements for a few days in September, owing to the fact that on account of the demands on the personnel and plant by work in Memphis Harbor just at this time pilots of private boats were depended upon to report the development of any shoals in the lower river.

The shoal at Cat Island developed very quickly and for about a week there was only 8 feet over the reef. Dredging by the *Iota* produced an excellent channel and no further work was required.

Memphis Harbor.—On account of the formation of a mud bar in Memphis Harbor (230), dredging operations were begun May 12, 1915, conformably with a resolution of the Mississippi River Commission, April 18, 1915, "to do such temporary dredging as may be necessary to provide access to the Memphis Harbor during the present season."

The plan and provision for permanent improvement of Memphis Harbor is stated in the following resolution of the Mississippi River Commission, November 20, 1915:

"1. That the general features of the project submitted by the first and second districts officer for the improvement of Memphis Harbor by the diversion of the waters of the Mississippi River through the Loosahatchie and Wolf Rivers, along the harbor front, be approved.

"2. That such plant pertaining to dredges and dredging as may be needed for the work proposed may be assigned thereto and operated under the direction of the secretary, the expenditure therefor to be made from the allotment for dredges and dredging to the extent of \$75,000."

For the permanent improvement of the harbor it was proposed to dredge a channel from a point on the harbor front near the foot of Jefferson Avenue, station 0+20, to a point on Wolf River about 2,000 feet above its mouth, and to construct a sheet piling or earth dam across Wolf River below the upper end thereof. The purpose of the dam was to increase the scouring effect in the harbor by forcing the water of the Mississippi through the Loosahatchie and Wolf Rivers along the Memphis front.

The channel as proposed was 3,000 feet long, with a bottom width of 50 feet at 5 feet below zero of the Memphis gauge, and side slopes of 2 to 1. It was estimated that its completion would require the removal of 435,947 cubic yards of material, of which 253,000 cubic yards had been removed on May 30, 1916.

Operations for completion of the project as above provided for were continued under the direction of the secretary Mississippi River Commission until December 1, 1916, when all uncompleted work on the project was transferred to the first and second districts officer, necessary dredging plant to be furnished by the secretary.

Surveys of the harbor made December 13, 1915, and May 16, 1916, showed that between those dates a deposit from 8 to 12 feet in depth had been made between the crest of the bar and the high-water line on the wharf. A survey made June 26, 1916, showed an additional deposit which raised the bar across the entrance to the harbor to a height of 14 feet on the Memphis gauge.

Dredging in the harbor extended 3,200 feet downstream from the foot of Jefferson Avenue (station 0+20 on the canal line) to a point below the foot of Beale Avenue. The dredge *Zeta* was placed in the upper part of the harbor May 23, 1916, to extend the channel work which had been done by the *Epsilon* through the low ground below the lower end of the channel. Dredging was commenced at 1.25 a. m. May 27, the material being discharged to the west of the channel. During part of June the *Zeta* was engaged in deepening a cut made by the dredge *Cincinnati*. Dredging by the *Zeta* in the upper end of the harbor was continued until July 15, when the dredge was moved farther up the channel. The *Zeta* dredged in the channel until July 31, and from that date until August 14 in the lower end of the harbor.

On July 11 the dipper dredge *Cincinnati* commenced dredging in the harbor, and on the 15th had completed a channel through the bar at the entrance to the harbor. The dredge was then moved farther upstream, where it was operated until September 5. On that date it began dredging in the upper end of the harbor in conjunction with the *Epsilon*, removing a serious slide in the channel between Court and Jefferson Streets. The *Cincinnati* also dredged from the sides of the cut, this work being completed September 26. The *Cincinnati* was again used in the harbor November 1 to 30, widening the channel opposite the wharf boats and removing mud from the harbor. * The dredged material was loaded into scows and towed out into deep water and dumped.

The dredge *The Ram* was operated in the lower part of the harbor June 6 to 16, and preparations were commenced for returning the dredge to the fourth district officer at New Orleans, La.

The *Iota* was used August 22 to September 2 cleaning mud from the harbor below the wharf boats.

The *Epsilon* was operated in the lower part of the harbor from September 6 to October 20 on maintenance of the harbor, and from November 14 to 30 on maintenance of the entrance to the harbor.

The amount of material to be removed from the harbor was greatly increased by material sliding in from the bar and by a large deposit left by the June rise. About 480,475 cubic yards were dredged in the harbor. Depths in the latter were increased from about 12 or 14 feet on the gauge to 6 feet below zero of the gauge. Navigable depths in the harbor were maintained at all times.

The total excavation in the harbor and in the canal was 946,248 cubic yards, at a total cost of \$100,982.80, or 10.67 cents per yard. The cost per cubic yard in the harbor was 5.68 cents, the lower cost being due to softer material, absence of obstructions, and low banks.

Wolf River Dam.—In order to derive the full benefit of the erosive effect of the current along the wharf it was necessary to obstruct one of the channels by a dam. The dam was not required to withstand much lateral pressure, and an especially durable structure was not deemed necessary, as it was very probable that the old channel would soon be filled with sediment. The only serious dangers to be provided against were flanking of the ends and erosion of the bottom around the piles.

The dam as first designed was to consist of a row of piles spaced 5 feet apart, and vertical timbers held in place by two horizontal waling pieces, one at the top of the piles and the other 10 feet below or at the water surface at the time of construction. Erosion was to be prevented by a foot mat. This design contemplated construction with floating plant. A rapid fall in the stage of the river during August and September made dry construction necessary. Even in the deepest part of the channel there was not sufficient water to float a pile driver. Spoil from the channel had caused a fill which greatly reduced the cross section on the site of the proposed dam. At the lowest point the top of the mat was 8 feet above the zero of the Memphis gauge.

In order to quickly stop all low-water flow through Wolf River pending completion of the dam, a small rock dike 100 feet long and with crest at 13 feet on the gauge was built across the channel. This proved to be effective in maintaining a current in the harbor during the low-water season.

When dry construction of the dam became necessary the design was changed by substituting 2-inch oak sheathing for the vertical timbers. Early in September 3 foot mats were sunk on the dam site from the 20-foot contour on the north side of the channel to the 20-foot contour on the south side. The driving of piling through this mat was begun with a floating driver, but only a few were driven when the falling stage made it necessary to use a skid driver. The leads and engine were moved from pile sinker No. 13 and placed

on skids on the mat, and a steam line was run from the boiler on the pile sinker. Driving by this method was commenced October 4. Waling pieces 12 inches thick were bolted to the piles, and the work of placing the sheathing followed immediately. The dam was completed November 30, except for some braces on the lower side.

Additional protection against erosion was provided for by bank revetment extending 100 feet upstream and 150 feet downstream from the upper and lower edges of the foot mats respectively. This revetment covered the bar formed just below the dam by material excavated from the channel.

The cost of the dam was \$3,309.45, and of the mat, shore, and bottom protection \$16,537.96. The revetment work was done by the first and second Mississippi River districts office.

Dredge depot at West Memphis, Ark.—Buildings and plant on land owned by the United States have been cared for and repaired, and a great amount of work incident to the care of a large fleet and its maintenance in a state of efficiency has been done.

Plant.—During the year the following plant pertaining to this project, when not in operation, has been cared for at the fleet at West Memphis, Ark.:

Dredges <i>Beta, Gamma, Delta, Epsilon, Zeta, Iota, Kappa, Henry Flad,</i>	
and <i>B. M. Harrod</i>	9
Steamboats <i>Sachem, Choctaw, Nokomis, Leota, Wynoka, Inspector M. R. C., Saturn, Jupiter, Venus, Vulcan, Mercury, and Mars</i>	12
Pile sinkers Nos. 13, 971, 981, 982, and 983.....	5
Derrick boat <i>M. R. C. No. 1</i>	1
Barges Nos. 041 and 051.....	2
Pump boat.....	1
Quarterboat <i>Wabash No. 3</i>	1
Gasoline launches.....	3
Calking flats.....	1
Sectional dock, sections.....	6

The *Inspector M. R. C., Saturn, Jupiter, Venus, Mercury, Vulcan, and Mars* were used at different times as fleet tenders during the lay-up season.

Buildings and grounds.—Buildings and grounds were cared for during the year.

Marine ways—Repairs.—Minor repairs were made during the year, and mud deposited by high water was removed from the gear pits and tracks.

OPERATION.

Plant.	Docked.	Shifted.	Un-docked.
Snag boat John N. Macomb.....		May 15, 18, 19.	May 19
Dredge Iota.....	June 9		June 26
Pile sinker No. 993.....	June 26		July 7
Barge No. 051.....	July 10		July 13
Dump scow No. 10.....	July 24	July 26.	July 31
Dredge Henry Flad.....	Aug. 28		Oct. 13
Concrete Mixer No. 1208.....	Oct. 14		Dec. 15
Steamer Mississippi.....	Dec. 18		Jan. 22
Barge No. 051.....	Jan. 22		Jan. 29
Dredge Kappa.....	Feb. 17	Feb. 19.	
Ways in use.....		days.....	305
Ways idle.....		do.....	61
Dredge fleet boats docked.....			4
Dredge fleet barges docked.....			2
Dredge fleet pile sinkers.....			1
Boats of other engineer districts.....			2
Mud scows docked.....			1
Number of dockings.....			9
Number of undockings.....			9
Character and number of craft handled:			
Dredges.....			3
Steamboats.....			1
Snag boats.....			1
Floating concrete mixers.....			1
Pile sinkers.....			1
Mud scows.....			1
Barges.....			2

Total tonnage handled	tons	4, 737
Maximum load handled at any docking	do	1, 100
Average load handled	do	520
Total cost of operation		\$284. 19
Total cost of repairs		\$472. 97
Cost of docking per ton		\$0. 06
Cost of docking per ton (repairs included)		\$0. 18

Coal.—Twenty-four barges of Baker lump coal, containing 13,050.35 tons; 20 barges of mine-run coal, containing 11,765.66 tons; and 15 barges of pea and slack coal, containing 8,408.50 tons, were purchased from the West Kentucky Coal Co. under contract. Open-market purchases aggregating 3,098.6 bushels were purchased at various places along the river by boats in transit.

The steamer *Jupiter*, with pile sinker No. 971 in tow, left the dredge fleet May 27 for Caruthersville, Mo. (110), for the purpose of receiving and caring for the coal to be delivered there under contract. The *Jupiter* returned to the dredge fleet on June 3. Pile sinker No. 971 was later transferred to work in the Ohio River, and was returned to the dredge fleet December 20. Pile sinker No. 981 was taken from the dredge fleet to replace No. 971 at the coal fleet.

The coal fleet located at Caruthersville, Mo., was cared for at that place until the close of the dredging season, when it was moved to the dredge fleet by the steamer *Leota*.

Subsistence.—All employees were furnished subsistence in kind. During the year 95,566 rations were served at a cost of \$0.5051 raw and \$0.6184 served, including wages of cooks, waiters, and all necessary labor in caring for quarters.

Inspection of floating plant.—The requirements of the inspection service are or will be fully complied with on all floating plant placed in commission for service.

New plant.—No new plant was built during the year.

Condition at the end of year.—A navigable channel has been maintained since 1895, and a channel of project dimensions has been maintained since 1902, except as follows: For 18 days in 1903 and a few days in 1904 the depths at one bar were 8 and 8½ feet. For a few days there was less than 9 feet at five bars in 1908, seven bars in 1910, five bars in 1914, and two bars in 1916. At one bar in 1913 and four bars in 1916 the required width was not maintained.

The project depth of 9 feet with width of 250 feet was exceeded at all bars below Cairo at the end of the year.

Local cooperation.—None.

Effect of improvement.—Continuous navigation of the river below Cairo by river steamboats has been made possible.

Proposed operations.—It is proposed to operate as many units of dredging plant as may be necessary to fully maintain the project during the low-water season, to maintain the dredging plant in a state of efficiency, and make bar surveys in connection with dredging operations.

For expenditures see money statements, page 3441.

4. LEVEES: CAPE GIRARDEAU, MO., TO ROCK ISLAND, ILL.

Location and description.—The portion of the Mississippi River included in this section for levees extends over about 452 miles of river, from Cape Girardeau, Mo., 55 miles above Cairo, to near Rock Island, Ill., 507 miles above Cairo.

The district embraces 13 basins on the west bank of the river with an area of 546 square miles and a river frontage of 228 miles and 9 basins on the east bank of the Mississippi River with an area of about 708 square miles and a river frontage of 270 miles.

Original condition.—The lands adjacent to the river on either side were subject to overflow at high water, the overflow extending from bluffs to bluffs. An area of about 980 square miles was partially protected from overflow by levees constructed by 42 local levee and drainage districts. Fourteen of these local districts, having an area of about 315 square miles with a river frontage of 96 miles, were located on the west bank of the river, and 28 districts, having an area of about 665 square miles with a river frontage of about 257 miles, were located on the east bank. While the expenditures for levees by local districts prior to June 30, 1915, amounted to about \$6,000,000, the levees were not adequate to control the floods that occur at intervals in this portion of the river.

Previous projects.—No comprehensive project for levees in this section have been adopted prior to March 4, 1913.

Levee work had been done at three localities previous to the existing project; with a total expenditure by the United States for construction, preservation, and repair of these levees as shown in the statement below:

Flint Creek to Iowa River (430 to 460 ¹ R.)	\$346,325.54
Warsaw to Quincy (348 to 381 ¹ L.)	105,500.00
Sny Island Levee (282 to 335 ¹ L.)	106,728.99
Total	558,554.53

The funds used for work pertaining to these levees were provided by river and harbor acts of July 5, 1884; August 5, 1886; August 11, 1888; September 19, 1890; July 13, 1892; June 3, 1896; and June 13, 1902; and by sundry civil acts of March 2, 1895, and March 3, 1899.

Present project.—The present project is to build or enlarge certain levees to a grade and section sufficient to protect adjacent lands from overflow. This project was adopted in 1913.

Above the mouth of the Missouri River the levees are to be built or enlarged to a section having a crown width of 6 feet with side slopes 1 on 3. The established grade is usually 3 feet above the highest known flood. Below the mouth of the Missouri River the levees are to be built to the standard section, crown width of 8 feet, river slope 1 on 3, land slope 1 on 3, to 8 feet below crown, thence a banquette 20 to 40 feet in width, with back slope 1 on 4.

Operations and results prior to the fiscal year.—Under the present project, work has consisted in the construction and enlargement of certain levees. The expenditures by the United States for levees, under this project prior to the beginning of the fiscal year, are shown in the following statement:

East Cape Girardeau and Clear Creek drainage district, Ill. (47 to 60 ¹ L.)	\$20,000.00
East Side levee and sanitary district, Ill. (185 to 208 ¹ L.)	60,000.00
Elsberry drainage district, Mo. (267 to 281 ¹ R.)	37,753.81
Sny Island levee drainage district, Ill. (282 to 335 ¹ L.)	24,370.75
Hunt drainage district, Ill. (368 to 380 ¹ L.)	14,702.06
Muscataine Island levee district, Iowa (467 to 480 ¹ R.)	99.91
Total	156,926.53

The work has been successful in increasing the amount of protection afforded by the levees.

Operations and results during the fiscal year—Warsaw to Quincy, Ill. (381 to 348¹).—Under the allotments of \$20,000 from the funds carried by the river and harbor act of March 4, 1913, and \$30,000 from the funds carried by river and harbor act of July 27, 1916, for levees in this locality enlargement work between stations 0 and 180 of the Hunt Levee (377 to 380¹ L.), under contract with Cameron, Joyce & Co., uncompleted at the end of the previous year, was continued. A total of 17,674 cubic yards was placed during the year at 20½ cents per cubic yard. It is proposed to expend the balance available under the allotments mentioned above in extending the enlargement of the Hunt Levee as far downstream as the funds will permit.

Quincy to Hamburg Bay, Ill. (348 to 282¹).—Under the allotment of \$80,000 for levees in this locality from the funds carried by the river and harbor act of March 4, 1913, no work was done on the enlargement of the Sny Island Levee between stations —18 and 482 (335 to 226¹ L.) under contract with the Bondurant Construction Co., uncompleted at the end of the previous year, and the contract was annulled.

It is proposed to expend the available balance of this allotment, together with the allotment of \$70,000 for levees in this locality, from the funds carried by the river and harbor act of July 27, 1916, in completing the work formerly covered by the contract with the Bondurant Construction Co., and in extending the enlargement downstream as far as the funds will permit.

La Grange to mouth of Missouri River, Mo. (357 to 208¹).—The allotment of \$20,000 for levees in this locality from the funds carried by the river and harbor act of July 27, 1916, is being expended in constructing a new levee along the Mississippi River in the Riverland Levee district, Mo. (312 to 306¹). This is a new district with an area of about 6,229 acres. The district plans the construction of about 14 miles of levee embankment, averaging about 11 feet in

¹ Miles above Cairo.

height, extending from the bluffs near Ashburn, Mo., across the north end of the district 0.8 mile to the Mississippi River at Mundy Landing (312' R.), thence downstream along the bank of the Mississippi River 7.5 miles to near the mouth of Salt River, thence up that stream along its left bank a distance of 5.7 miles to the bluffs near Riverland Station, Mo. The run-off from rainfall in the district will be carried through drainage ditches to a pumping station in the lower end of the district and pumped over the levee into the river.

A contract was entered into with Fred C. Morgan on May 11, 1917, for the construction of 110,000 cubic yards of embankment between station 0, at Munday Landing, and station 80 at 16 cents per cubic yard. Work under this contract commenced May 17, and 8,907 cubic yards had been placed prior to June 1, 1917.

Head of Chouteau Island to Prairie du Pont, Ill. (208 to 185').—The allotment of \$25,000 for levees in this locality from the funds carried by the river and harbor act of July 27, 1916, is being expended in closing a gap between stations 886 and 895 of the front levee in the East Side Levee and sanitary district, Ill. A contract was entered into with the Hillsboro Dredging Co. on January 17, 1917, for placing 40,000 cubic yards of embankment by the hydraulic method at 35½ cents per cubic yard. Work under this contract commenced May 9, and a total of 662 cubic yards had been placed prior to June 1, 1917.

Grand Tower to Gale, Ill. (8½ to 48').—The allotment of \$20,000 for levees in this locality from the funds carried by the river and harbor act of July 27, 1916, is being expended in reconstructing and enlarging a part of the levee in the East Cape Girardeau and Clear Creek drainage district, Ill. (60 to 48' L.). On December 29, 1916, a contract was entered into with Roach & Stansell for 100,000 cubic yards of reconstruction and enlargement work between stations 63+67 and 173 of this levee at 15.38 cents per cubic yard. Work under this contract commenced February 21, and a total of 41,217 cubic yards had been placed prior to June 1, 1917.

Condition at the end of the fiscal year.—For complete report on examination of this district by the Mississippi River Commission, with recommendations, see House Document 628, Sixty-third Congress, second session.

The work under contract is approximately 90 per cent complete. Plates 3, 4, 5, 6, 7, 8, 9, and 10 accompanying show present levee grades with relation to the project grades, and plates 11, 12, and 13 show location of levees.

Local cooperation.—The expenditures for levees by local levee boards in localities where expenditures have been made or proposed by the United States under this project are shown by the following statement:

Drury drainage district, Ill.	\$148,803.69
Muscatine Island levee district, Iowa	76,471.14
Henderson County drainage district No. 1, Ill.	116,812.00
Hunt drainage district, Ill.	272,800.00
Sny Island levee drainage district, Ill.	1,517,911.77
Riverland levee district, Mo.	55,081.28
East Side levee and sanitary district, Ill.	3,332,289.06
East Cape Girardeau and Clear Creek drainage district, Ill.	144,778.30
Total	5,664,947.24

Effect of improvement.—Added protection has been given against overflow to about 222,000 acres of land.

Proposed operations—Rock Island to New Boston, Ill. (508 to 458').—It is proposed to expend the allotment of \$15,000 for levees in this locality, from the funds carried by the river and harbor act of July 27, 1916, in the reconstruction of a part of the levee in the Drury drainage district, Ill. This district is in Rock Island County, Ill., the upper limit being at Drury Landing and the lower limit at Copperas Creek. The district has a frontage of 8.5 miles on the Mississippi River, from 476.5 to 485 miles above Cairo. The existing levee, beginning at the bluffs about 3 miles above the bridge over the Mississippi River at Muscatine, Iowa, runs due north about one-half mile to Drury Landing, thence downstream along the east bank of the Mississippi River 7 miles, to the mouth of Copperas Creek, thence along the right bank of Copperas Creek 2 miles to ground above probable overflow. The area of protected land in the district is 5,300 acres, assessed valuation is given at \$80,000 and the expendi-

¹ Miles above Cairo.

tures by the local district authorities for levees and drainage is stated to amount to \$114,997. The proposed work will begin at the upper end of the district and will extend downstream as far as available funds will permit.

Muscatine to mouth of Iowa River, Iowa (381 to 460¹).—It is proposed to expend the allotment of \$30,000 for levees in this locality, from the funds carried in the river and harbor act of July 27, 1916, in reconstructing the Muscatine Island Levee between stations 142+50 and 328. The levee of the Muscatine Island district extends from a point just south of Muscatine, Iowa, to Port Louisa, Iowa, excepting where high ground exists about the half-way point along the Mississippi front. The upstream stretch of levee is 5 miles in length, and the downstream portion about 5.6 miles. The levee contains such a combination of defects as to render its relocation and reconstruction desirable. At Port Louisa the levee joins the levee in the Muscatine-Louisa drainage district No. 13. The combined area of the two districts is about 21,350 acres.

Oquawka to Dallas, Ill. (441 to 414¹).—Under the allotment of \$20,000 for levees in this locality from the funds carried by the river and harbor act of July 27, 1916, it is proposed to enlarge a part of the levee along the Mississippi River in Henderson County drainage district No. 1. This district is located in Henderson County, Ill., 428 to 436 miles above Cairo. The levee begins at the embankment of the Kelthsburg branch of the Chicago, Burlington & Quincy Railroad, runs 2 miles along the south side of the Henderson River diversion channel to near the Mississippi River, thence downstream along the river about 8 miles to the railroad bridge across the Mississippi River at Burlington. The existing levee has an average height of about 12 feet and contains about 850,000 cubic yards of material. The area of the district is 7,680 acres. The work proposed will commence at the upstream end of the levee along the Mississippi River and extend downstream as far as funds will permit.

The following papers and plates accompany this report:

Money statements.

Abstract of contracts in force.

Commercial statistics.

Statement of charts issued and sold.

Table No. 1. Highest and lowest gauge readings in 1916, Mississippi River and tributaries.

Table No. 2. Highest gauge readings of 1917, Mississippi River and tributaries.

Table No. 3. Maximum height of high water above mean Gulf level, 1917, Cairo to Head of Passes.

Table No. 4. Cost of dredging operations, May 1, 1916, to April 30, 1917.

Table No. 5. Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1916.

Table No. 6. Dimensions of channels through bars, Mississippi River below Cairo, dredging season of 1916.

Table No. 7. Summary of dredging operations, Mississippi River below Cairo during the low-water season of 1916.

Plate No. 1. Hydrograph of Mississippi River, Cairo, Ill., to Fort Jackson, La., June 1, 1916, to May 31, 1917.

Plate No. 2. Profile of high water of 1917, Mississippi River, Cairo, Ill., to Head of Passes, La.

Plate No. 3. Profile of Drury Levee.

Plate No. 4. Profile of Muscatine Island Levee.

Plate No. 5. Profile of levee in Henderson County Drainage District No. 1, Ill.

Plate No. 6. Profile of Hunt and Lima Lake Levee.

Plate No. 7. Profile of Sny Island Levee.

Plate No. 8. Profile of Riverland Levee.

Plate No. 9. Profile of Front Levee, East Side Levee, and Sanitary District.

Plate No. 10. Profile of East Cape Girardeau Levee.

Plate No. 11. Location of levee work, Rock Island to Nauvoo.

Plate No. 12. Location of levee work, Nauvoo to Alton.

Plate No. 13. Location of levee work, Alton to Thebes.

Appendix 1A. Laws affecting the Mississippi River Commission July 1, 1916, to June 30, 1917.

CLARKE S. SMITH,
Major, Corps of Engineers, United States Army.

¹ Miles above Cairo.

MONEY STATEMENTS.

APPROPRIATION FOR IMPROVING MISSISSIPPI RIVER

July 1, 1916, balance unexpended.....	\$72,054.90
Amount received from sale of Engineer property, credited under the provisions of section 5 of river and harbor act of June 13, 1902, in month named, to allotment stated: March, 1917. "Dredges and dredging".....	\$1,000.50
Amount received in November, 1916, from sale of steamer Wynoka (E. D. 87050-421 Sec. MRC. 2284-10) credited to "Dredges and dredging".....	20,000.00
Amount allotted from appropriation by river and harbor act of July 27, 1916, approved by the Acting Secretary of War August 14, 1916 ("Mississippi River Commission," \$50,000; "Surveys, gauges, and observations," \$80,000; "Dredges and dredging," \$250,000; "Levees Cape Girardeau, Mo., to Rock Island, Ill.," \$230,000).....	590,000.00
Amount, \$15.76, arising from refundments pertaining to extinct or unknown allotments, less debit of Treasury settlement No. 13704, December 26, 1900, as reported by the Chief of Engineers, U. S. Army, June 23, 1916, and credited to allotment for "Mississippi River Commission," December, 1916.....	14.02
	<u>611,014.52</u>

June 30, 1917, amount expended during fiscal year.....
 683,069.42
 206,045.84

July 1, 1917, balance unexpended..... 476,423.58
 July 1, 1917, outstanding liabilities..... 35,635.61
 July 1, 1917, amount covered by uncompleted contracts..... 150,397.66
 186,033.27

July 1, 1917, balance available..... 290,390.31

APPROPRIATION FOR MAINTENANCE AND IMPROVEMENT OF EXISTING RIVER AND HARBOR WORKS.

July 1, 1916, balance unexpended..... \$357,647.48
 Amount received from sale of contract prints, credited under the provisions of section 5 of river and harbor act of June 13, 1902, in December, 1916, to allotment for "Surveys, gages, and observations"..... .79
 Total..... 357,648.27

¹Includes \$1,191.28 reimbursable as follows: \$740 from appropriation for Army transportation fiscal year, 1916-17 (Engineer operations in the field); \$451.28 from St. Louis district office.

²The amount, \$357,642.53, reported in annual report for 1916, has been increased \$4.95, being refundments, in the months stated, of the following overpayments:

October, 1916, vouchers 119, 188, 189, 190, and 191, January, 1916, \$0.15, \$0.35, \$0.35, \$0.20, \$0.20, respectively (surveys, gauges and observations).....	\$1.25
October, 1916, voucher 66, January, 1916 (dredges and dredging).....	.10
January, 1917, vouchers 66 and 208, January, 1916, and April, 1916, \$0.15 and \$0.25, respectively (dredges and dredging).....	.40
August, 1916, voucher 9, December, 1915 (Mississippi River Commission).....	.75
October, 1916, vouchers 63 and 64, March, 1916, \$0.40 and \$0.25, respectively (Mississippi River Commission).....	.65
October, 1916, vouchers 24, 25, 28, 54, 94, and 96, March, 1916, \$0.10, \$0.10, \$0.30, \$0.25, \$0.10, \$0.10, respectively (surveys, gauges, and observations).....	.95
February, 1917, vouchers 60, 61, and 62, March, 1916, and voucher 31, April, 1916, \$0.15, \$0.15, \$0.15, and \$0.25, respectively (surveys, gauges, and observations).....	.70
October, 1916, voucher 65, March, 1916 (dredges and dredging).....	.15
Total.....	<u>4.95</u>

3476 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

June 30, 1917, amount expended during fiscal year for improvement and maintenance.....	\$246, 158. 61
July 1, 1917, balance unexpended.....	111, 489. 66
July 1, 1917, balance available.....	111, 489. 66

APPROPRIATION FOR GAUGING WATERS OF THE MISSISSIPPI RIVER AND ITS TRIBUTARIES.¹

July 1, 1916, balance unexpended.....	\$1, 631. 70
Amount allotted by Chief of Engineers from permanent annual appropriation made by section 6 of river and harbor act of Aug. 11, 1888, as amended by section 9 of river and harbor act of June 13, 1902.....	9, 100. 00
	10, 731. 70
June 30, 1917, amount expended during fiscal year.....	\$8, 313. 92
June 30, 1917, amount reverted to Treasury during fiscal year.....	646. 09
	8, 960. 01
July 1, 1917, balance unexpended.....	1, 771. 69
July 1, 1917, outstanding liabilities.....	906. 59
July 1, 1917, balance available.....	865. 10
Amount that can be profitably expended in fiscal year ending June 30, 1919.....	9, 100. 00

ITEMIZED STATEMENT OF EXPENDITURES DURING THE FISCAL YEAR ENDING JUNE 30, 1917, SUBMITTED IN COMPLIANCE WITH REQUIREMENT OF SECTION 6 OF RIVER AND HARBOR ACT OF AUG. 11, 1888.

Observations:

Pay of permanent gauge observers.....	\$3, 568. 50
Inspections and repairs:	
Inspection of gauges on Mississippi River by junior engineers and parties on steamers.....	\$1, 602. 16
Inspection of gauges on tributaries.....	205. 19
Renewals and repairs of gauges and bulletins.....	161. 96
	1, 969. 31

Office expenses and contingencies:

Pay of assistant and junior engineers, surveyors, and clerks.....	2, 214. 12
Stationery, printing, office rent, etc.....	561. 99
	2, 776. 11
Total.....	8, 313. 92

APPROPRIATION FOR GAUGING WATERS OF THE MISSISSIPPI RIVER AND ITS TRIBUTARIES.

Allotments from general appropriations for examinations, surveys, and contingencies of rivers and harbors by acts of—

Mar. 3, 1871 (allotment Apr. 11, 1871).....	\$5, 000. 00
June 10, 1872 (allotment July 11, 1872).....	5, 000. 00
Mar. 3, 1873 (allotment May 17, 1873).....	5, 000. 00
June 23, 1874 (allotment July 29, 1874).....	5, 000. 00
Mar. 3, 1875 (allotment Mar. 22, 1875).....	5, 000. 00

¹ The custody and care of the gauges maintained under this appropriation were assumed by the Mississippi River Commission Feb. 11, 1901, on which date they were transferred to the secretary under authority of Secretary of War, dated Jan. 25, 1901.

² The amount, \$1,680.65, reported in annual report for 1916, has been increased \$1.05 by the secretary by refundments for overpayments, as follows:
October, 1916, voucher 124, March, 1916 (reverted to Treasury)..... \$0. 40
February, 1917, voucher 32, April, 1916 (reverted to Treasury)..... . 65

Specific appropriations by river and harbor acts of—

Aug. 14, 1876	\$5,000.00
June 18, 1878	5,000.00
Mar. 3, 1879	5,000.00
June 14, 1880	5,000.00
Mar. 3, 1881	5,000.00
Aug. 2, 1882	5,000.00
Deficiency act of Mar. 12, 1884	2,100.00
Specific appropriations by river and harbor acts of—	
July 5, 1884	5,000.00
Aug. 5, 1886	5,000.00
Allotted from specific appropriation by river and harbor act of Aug. 11, 1888 (allotment Oct. 17, 1888)	
	8,700.00
Deficiency act of Oct. 19, 1888	3,800.00
Allotments from permanent indefinite appropriation made by section 6 of river and harbor act of Aug. 11, 1888, for fiscal years, viz:	
1890 (allotment Aug. 23, 1889)	9,000.00
1891 (allotment Aug. 19, 1890, \$8,700, less \$3,518.34 withheld in United States Treasury under ruling that only \$6,000 can be expended each fiscal year)	5,181.66
1892 (allotment July 17, 1891)	5,100.00
1893 (allotment July 15, 1892)	5,500.00
1894 (allotment July 18, 1893)	5,500.00
1895 (allotment June 5, 1894)	5,500.00
1896 (allotment June 4, 1895)	5,500.00
1897 (allotment May 13, 1896)	5,500.00
1898 (allotment June 16, 1897)	5,500.00
1899 (allotments May 27, 1898, \$5,500, July 12, 1898, \$500)	6,000.00
1900 (allotment June 1, 1899)	5,500.00
1901 (allotment July 2, 1900)	6,000.00
1902 (allotment July 31, 1901)	6,000.00
Allotments from permanent annual appropriation made by section 6 of river and harbor act of Aug. 11, 1888, as amended by section 9 of river and harbor act of June 13, 1902, for fiscal years, viz.:	
1903 (allotment July 23, 1902, \$9,600, less \$500 allotted Aug. 2, 1902, to St. Paul, Minn., district)	9,100.00
1904 (allotment Apr. 18, 1903)	9,100.00
1905 (allotment Aug. 11, 1904)	9,100.00
1906 (allotment June 30, 1905)	9,100.00
1907 (allotment July 2, 1906)	9,100.00
1908 (allotment July 24, 1907)	9,100.00
1909 (allotment July 3, 1908)	9,100.00
1910 (allotment July 13, 1909)	9,100.00
1911 (allotment July 27, 1910)	9,600.00
1912 (allotment Feb. 7, 1911)	9,100.00
1913 (allotment May 29, 1912)	9,100.00
1914	9,100.00
1915 (allotment Sept. 2, 1914)	9,100.00
1916 (allotment July 23, 1915)	9,100.00
1917 (allotment Aug. 3, 1916)	9,100.00

Total 292,181.66

3478 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1917.

Expended.

	To June 30, 1916.	During year ending June 30, 1917.	Total.
Expenditures.....	\$23,997.11	\$8,313.92	\$272,312.08
Unexpended balances reverted to Treasury.....	17,452.85	646.09	18,097.99
Total.....	281,449.96	8,960.01	290,409.97
Unexpended balance June 30, 1917.....			1,771.69
Total appropriated, etc.....			292,181.66

¹ The amount, \$23,998.16, reported in annual report for 1916, has been decreased \$1.05, by refundments of overpayments, by the secretary, as follows:

October, 1916, voucher 124, March, 1916 (reverted to Treasury).....	\$0.40
February, 1916, voucher 32, April, 1916 (reverted to Treasury).....	.65
	1.05

APPROPRIATION FOR WATERWAY FROM LOCKPORT, ILL., TO ST. LOUIS, MO.

Act of June 13, 1902 (river and harbor).....	\$25,000.00
Amount transferred from allotment for "Survey of Illinois and Des Plaines Rivers, Ill.," as reimbursement.....	1,093.40
Total.....	26,093.40
Expended to June 30, 1906.....	\$22,291.23
Unexpended balance carried to surplus fund on June 30, 1909, under the provisions of section 10 of sundry civil act of Mar. 4, 1909.....	3,802.17
	26,093.40

APPROPRIATION FOR CLAIMS FOR DAMAGES BY COLLISION, RIVER AND HARBOR WORKS.

Act of Apr. 6, 1914 (urgent deficiency).....	\$58.84
Expended in fiscal year 1914.....	58.84
Act of Sept. 8, 1916 (general deficiency).....	427.30
Expended in fiscal year 1917.....	427.30

Abstract of contracts in force June 30, 1917—Improving Mississippi River, Mississippi River Commission, Secretary's office.

Contractor.	Amount and character of work.	Price.	Date of contract.	Date of approval.	Date of beginning work.	Date of expiration.	Percentage of completion.
Cameron, Joyce & Co.	88,000 cubic yards levee work in Hunt drainage district, Ill.	23½ cents per cubic yard.	Sept. 22, 1914	Oct. 15, 1914	Oct. 27, 1914	Dec. 31, 1915	98.9
Combustion Engineering Corporation.	Mechanical stokers on dredge B. M. Harrod.	\$0,150.	Apr. 7, 1916	May 3, 1916	May 10, 1916	Oct. 12, 1916	93.0
International Building Co.	Mechanical stokers on dredge Henry Flad.	\$6,850	June 28, 1916	Emergency.	July 1, 1916	June 31, 1917	100
Southwestern Telegraph & Telephone Co.	Lease of offices and storage rooms.	\$66 per annum.	July 1, 1916	do.	do.	do.	100
	Telephone service.						
	Two extension telephone desk sets.	\$36 per annum.					
	Cut-out switch.	\$2 per annum.					
Cumberland Telephone & Telegraph Co.	Telephone service.	\$78 per annum.	July 3, 1916	do.	do.	do.	100
Lloyd W. Lang trustee	Lease of water-front privileges.	\$150 per annum.	Aug. 23, 1916	do.	do.	do.	100
Reach & Stansell.	100,000 cubic yards levee work in East Cape Girardeau and Clear Creek drainage district, Ill.	15.33 cents per cubic yard.	Dec. 29, 1916	Jan. 25, 1917	Feb. 2, 1917	Dec. 31, 1917	51.8
Hillboro Dredging Co.	40,000 cubic yards levee work in East Side levee and sanitary district, Ill.	35½ cents per cubic yard.	Jan. 17, 1917	Feb. 12, 1917	Feb. 19, 1917	do.	17
A. Hoen & Co.	31,500 detail charts.	\$18 per 100.	do.	Feb. 7, 1917	Feb. 14, 1917	Aug. 14, 1917	8
	3,000 detail charts.	\$35 per 100.					
	11,500 inch-mile maps.	\$10 per 100.					
	600 inch-mile maps.	\$12 per 100.					
	Lease of water-front privileges.	\$100 per annum.					
Chas. W. Hunter.	3,500 tons screened lump coal.	\$4.05 per ton.	Mar. 15, 1917	Emergency.	Mar. 1, 1917	June 30, 1917	100
West Kentucky Coal Co.	6,250 tons mine-run coal.	\$3.20 per ton.	do.	May 4, 1917	May 10, 1917	June 30, 1918	.....
	4,000 tons pea and slack coal.	\$3.20 per ton.					
Fred C. Morgan.	110,000 cubic yards levee work in Riverland levee district, Mo.	16 cents per cubic yard.	May 11, 1917	May 31, 1917	June 11, 1917	Dec. 31, 1917	21.2

Time limit waived.

TABLE No. 1.—Commercial statistics for calendar year 1916.

Tonnage between—	Number of passengers.	Receipts and shipments in tons.					
		Grain and its products.	Cotton.	Cotton seed and its products.	Live stock.	Coal and coke.	Lumber.
St. Louis and Cairo ¹	101,131	13,044	285	1,027	6,580	62,723	19,358
Cairo and Memphis ²	166,886	7,112	25,896	4,798	2,506	477,829	26,796
Memphis and Vicksburg ³	150,085	13,175	30,565	15,338	10,563	379,201	32,137
Vicksburg and New Orleans ⁴	38,287	13,239	6,053	8,324	3,331	349,394	70,612

Tonnage between—	Receipts and shipments in tons.						
	Logs.	Iron, steel, and metals.	Groceries and provisions.	Stone, gravel, and sand.	Oil.	Unclassified and miscellaneous.	Total.
St. Louis and Cairo ¹	82,854	4,468	9,061	771,753	19,569	75,051	1,065,778
Cairo and Memphis ²	184,270	313	11,575	429,779	1,054	33,720	1,205,647
Memphis and Vicksburg ³	155,034	4,206	20,984	1,059,150	2,395	87,239	1,809,577
Vicksburg and New Orleans ⁴	77,626	2,185	75,268	200,457	1,201,581	135,968	2,224,228

¹ Includes 12,752 tons coal, 196 tons groceries, 52,211 tons stone, and 5,490 tons miscellaneous handled by Government vessels.

² Includes 26,296 tons stone handled by Government vessels.

³ Includes 100 tons grain, 160 tons live stock, 9,500 tons coal, 150 tons lumber, 545 tons iron, 450 tons groceries, 69,864 tons stone, and 52,300 tons miscellaneous handled by Government vessels.

⁴ Includes 4,186 tons coal, 7,365 tons lumber, 228 tons iron, 64,372 tons stone, and 58,260 tons miscellaneous handled by Government vessels.

NOTE.—Each stretch is treated as a separate river, and tonnage carried between ports on different stretches will appear in the statistics of all intervening stretches; consequently the sum of the tonnage carried in the four stretches does not represent the total traffic on the river as a whole.

TABLE No. 2.—Receipts and shipments at principal ports.

Port.	Passengers carried in and out of port.	Receipts and shipments in tons.					
		Grain and its products.	Cotton.	Cotton seed and its products.	Live stock.	Coal and coke.	Lumber.
St. Louis, Mo. ¹	375,837	12,224	285	967	12,903	68,219	8,294
Memphis, Tenn. ²	127,637	14,727	25,897	8,547	6,290	138,326	3,145
Vicksburg, Miss. ³	13,340	2,224	1,256	4,019	740	278,677	1,674
New Orleans, La. ⁴	48,869	948,963	369,802	149,932	23,641	307,296	88,527

Port.	Receipts and shipments in tons—Continued.						
	Logs.	Iron, steel, and metals.	Groceries and provisions.	Stone, gravel, and sand.	Oil.	Unclassified and miscellaneous.	Total.
St. Louis, Mo. ¹	11,200	5,943	81,491	623,622	8,394	116,291	809,763
Memphis, Tenn. ²	77,683	2,255	14,962	362,966	428	22,776	678,286
Vicksburg, Miss. ³.....	.....	.....	7,214	14,373	600	9,345	320,122
New Orleans, La. ⁴	407,653	50,540	1,739,786	44,671	2,236,721	1,717,991	8,085,948

¹ Includes 301,006 passengers in local excursion traffic; also 12,752 tons coal, 196 tons of groceries, and 1,128 tons miscellaneous, handled by Government vessels.

² Includes 200 tons lumber, 21 tons iron, 485 tons groceries, 49 tons oil, and 37 tons miscellaneous, handled by Government vessels.

³ Includes 412 tons coal, 816 tons lumber, 14,373 tons stone, and 4,000 tons miscellaneous, handled by Government vessels; the traffic with the Yazoo River and its tributaries not included.

⁴ Includes exports and imports, and the domestic coastwise traffic as far as reported; also 1,053 tons coal, 228 tons iron, and 8,880 tons gravel, handled by Government vessels.

TABLE No. 3.—*Seagoing traffic at New Orleans, La.*

Arrivals and departures.	Number.	Tonnage.	Passengers.
Foreign-bound vessels.....	2,916	5,550,306	21,346
Coastwise vessels.....	749	1,866,250	20,397
Total.....	3,665	7,415,556	41,743

Receipts and shipments.

	Tons.
Grain and its products.....	940,301
Cotton.....	863,252
Cotton seed and its products.....	145,707
Live stock.....	21,240
Coal and coke.....	34,815
Lumber.....	85,121
Logs.....	398,653
Iron, steel, and metals.....	48,787
Groceries and provisions.....	1,671,877
Oils.....	2,229,711
Stone, gravel, and sand.....	5,735
Miscellaneous and unclassified.....	1,670,410
Total.....	7,615,609

TABLE NO. 4.—*Ferry traffic*

Location of ferries and transfers.	Number of passengers.	Tonnage of freight carried.					
		Grain and its products.	Cotton.	Cotton seed and its products.	Live stock.	Coal and coke.	Lumber.
At St. Louis, Mo.	418,255	144,000	120	.....	7,614	1,322,000	360,000
At Chester, Ill.; Little Rock, Mo.; Commerce, Mo.; and Cape Girardeau, Mo.	59,715	804	.....	.....	482	687,199	339
At Cairo, Ill., to Birds Point, Mo., Greenfield, Mo., and Wyckliffe, Ky.; at Cottonwood Point, Mo., and Hales Point, Tenn.	194,023	6	36	5	547	.....	2
At Memphis, Tenn., to Hopefield, Ark., Mound City, Ark., and West Memphis, Ark.	136,089	510	2,364	2,055	164	15	229
At Helena, Ark., to Trotters Point, Miss., and Arkansas City, Ark.	125,287	24,990	3,678	19,951	1,212	123,017	53,460
At Vicksburg, Miss., to Delta Point, La.	119,378	4,627	1,204	201	1,826	63,621	6,904
At Natchez, Miss.; Vidalia, La.; Ango'a, La.; Naples, La.; Baton Rouge, La.; Anchorage, La.; St. Joseph, La.; Harts Landing, Miss.; Plaquemine, La.	192,779	301,705	57,011	7,733	4,938	106,203	155,990
At New Orleans, La.	5,866,915	203,031	81,380	13,553	10,519	163,654	262,773

Location of ferries and transfers.	Tonnage of freight carried.						
	Logs.	Iron, steel, and metals.	Groceries and provisions.	Stone, gravel, and sand.	Oil.	Unclassified and miscellaneous.	Total tonnage.
At St. Louis, Mo.	.....	49,825	22,871	52,600	12,775	553,852	3,135,657
At Chester, Ill.; Little Rock, Mo.; Commerce, Mo.; and Cape Girardeau, Mo.	3,055	173	150	11,647	41	536,124	1,240,014
At Cairo, Ill., to Birds Point, Mo., Greenfield, Mo., and Wyckliffe, Ky.; at Cottonwood, Point, Mo., and Hales Point, Tenn.	.....	.....	64	.....	2	16,424	17,086
At Memphis, Tenn., to Hopefield, Ark., Mound City, Ark., and West Memphis, Ark.	.....	45	650	.....	65	8,048	14,148
At Helena, Ark., to Trotters Point, Miss., and Arkansas City, Ark.	4,996	12,186	73,937	1,122	13,580	11,830	344,589
At Vicksburg, Miss., to Delta Point, La.	.....	29,987	9,274	711	1,384	589,648	708,487
At Natchez, Miss.; Vidalia, La.; Ango'a, La.; Naples, La.; Baton Rouge, La.; Anchorage, La.; St. Joseph, La.; Harts Landing, Miss.; Plaquemine, La.	5,117	19,803	58,810	65,325	247,212	344,010	1,373,866
At New Orleans, La.	.....	155,278	.....	8,169	61,337	2,502,704	3,464,987

Transfer of empty cars not included in tonnage at railroad transfer points.

Owing to deficiency and inaccessibility of the records of some transportation companies, considerable tonnage, which should appear under classified heads above, had to be included in "Unclassified and miscellaneous."

Statement of maps and charts issued and sold from July 1, 1916, to June 30, 1917, improving Mississippi River, Mississippi River Commission, secretary's office.

Description.	Free issue.	Sold.	Total.
Sheets, Mississippi River, scale 1:20000.....	471	405	876
Sheets, Mississippi River, scale 1:10000.....	78	31	109
Sheets, lower Mississippi River, scale 1 inch = 1 mile.....	383	509	892
Sheets, upper Mississippi River, scale 1 inch = 1 mile.....	57	385	442
Sets, upper alluvial valley (4 sheets each).....	2	13	15
Sets, upper alluvial valley.....	1	3	4
Sets, lower alluvial valley (8 sheets each), 1913 edition.....	7	19	26
Sets, lower alluvial valley, 1913 edition.....	6	1	7
Sets, lower alluvial valley (8 sheets each), 1887 edition.....	2	7	9
Sets, lower alluvial valley, 1887 edition.....	1	2	3
Sets, harbor New Orleans, scale 1:10000 (4 sheets each).....	1	5	6
Sheets, district map of lower Mississippi River.....	8	6	14
Sheets, Lake Itasca Basin.....	1	.....	1
Sets, St. Francis Basin (2 sheets each).....	2	1	3
Sheets, St. Francis Basin.....	6	.....	6
Total.....	1,025	1,387	2,412

Proceeds deposited to the credit of the Treasurer of the United States, \$251.02.

TABLE NO. 1.—Highest and lowest gauge readings of 1916.

MISSISSIPPI RIVER.

Station.	Distance from Cairo.	Elevation of gauge zero above mean Gulf level.	Highest.			Lowest.					
			Prior to 1916.		1916	Prior to 1916.		1916			
			Date.	Gauge reading.		Date.	Gauge reading.				
Miles above.		<i>Feet.</i>									
1,090.		1,186.35	July 6-8, 1905.	16.36	Apr. 29, 30.	Apr. 8, 9, 1911.	0.75	Nov. 16.	3.25	Feet.	+ 2.60
874		684.24	Apr. 29, 1881.	19.7	Apr. 6, 9.	Dec. 7, 1912.	-1.0	Nov. 26.	1.7		+ 2.7
849		670.36	Apr. 30, 1881.	18.0	Apr. 8.	Nov. 26, 1892.	-1.33	Dec. 14.	2.0		+ 2.70
760		639.90	June 18, 1880.	16.87	Apr. 27.	Dec. 30, 1889.	-1.33	Dec. 15.	2.3		+ 2.68
688		608.16	June 22, 1880.	21.30	May 1.	do.	-1.10	Dec. 9-11.	3.6		+ 3.70
510.7		541.94	June 27, 1892.	19.4	May 5.	Dec. 5, 1910.	-1.15	Dec. 15.	2.3		+ 3.45
427.6		510.82	May 18, 19, 1888.	17.6	May 9.	Dec. 10, 1910.	-1.25	Dec. 24.	4.2		+ 5.45
405.5		502.23	June 30, 1892.	15.9	May 9, 10.	1895.	-3.4		12.0		+ 12.3
393.6		498.43	June 6, 1881.	21.40	May 1, 3.		-5.5	Dec. 24, 25.			
383.6		498.43	May 17, 18, 1888.	12.0	May 14.	Jan. 7, 1890.	-5	Dec. 17.	1.0		+ 3.1
328.2		477.35	June 8, 1881.	20.96	May 16.	Jan. 8, 1909.	-2.1	Dec. 21.	9		+ 2.70
323.4		448.93	June 8, 1903.	22.5	May 16.	Dec. 14, 1910.	-1.80	Dec. 25.	2.0		+ 2.9
216.2		403.66	June 11, 1903.	28.7	Jan. 31, Feb. 1.	Dec. 9, 1895.	-9				
216.2		313.54	June 9, 1903.	115.80	Jan. 31.	Dec. 18, 1897.	82.70	Dec. 23.	83.80		+ 1.10
190.8		379.79	June 10, 1903.	38.0	Jan. 31, Feb. 1.	Jan. 2, 1900.	-2.82	do.	2.20		+ 32
86		340.87	June 13, 1903.	33.4	Feb. 2.	Jan. 3, 1900.	-4.0	Dec. 24.	-1.67		+ 2.97
54.5		321.74	June 14, 1903.	33.80	Feb. 3.	Feb. 1, 1895.	1.1	do.	4.6		+ 3.6
48		304.54	do.	36.83	do.	Jan. 15, 1909.	6	Dec. 24, 25.	4.6		+ 4.0
		300.85	June 14, 15, 1903.	35.40	do.	do.	2	Dec. 25.	1.40		+ 1.20
		270.41	Apr. 7, 1913.	54.69	Feb. 4.	Dec. 24, 1871.	-1.0	do.	5.80		+ 6.80
Below.											
21.6		266.46	Apr. 8, 1913.	49.30	Feb. 5.	Nov. 6-8, 1895.	.06	do.	6.30		+ 6.25
99		255.04	Feb. 24, 1894.	41.50	Feb. 5, 6.	Nov. 11-13, 1879.	-17	do.	4.20		+ 3.65
70.3		255.96	Apr. 9, 1913.	44.61	Feb. 7.	Nov. 6-8, 1895.	.55	Dec. 28.	3		+ 3.65
122.5		230.50	Apr. 11, 12, 1913.	42.30	Feb. 7, 8.	Nov. 7, 8, 1895.	-3.35	do.	2.20		+ 2.04
175.4		208.74	Apr. 9, 1913.	44.07	Feb. 9.	Nov. 6-9, 1895.	16	Dec. 27.	2.8		+ 5.45
230		184.21	do.	46.55	Feb. 10.	Nov. 6-11, 1895.	-2.65	Dec. 28.	-1		+ 7.70
276.3		161.35	Apr. 10, 1913.	45.28	Feb. 11, 12.	Nov. 8, 9, 1895.	-7.80	Dec. 27.	3.10		+ 6.10
306.5		141.81	Apr. 22, 1913.	55.20	Feb. 10.	Nov. 12-14, 1895.	-3.00	do.	4.05		+ 5.55
352.7		127.25	do.	51.37	Feb. 10.	do.	-1.50	Dec. 28.			

Mouth White River, Ark.	382.2	108.88	Apr. 16, 1912.	56.58	do.	56.50	+	.15	Dec. 28, 1872.	.00	do.	9.15	+ 9.15
Arkansas City, Ark.	438.5	96.75	Apr. 12, 1912.	56.83	Feb. 10, 11.	56.4	+	1.07	Nov. 9, 10, 1893.	-2.55	Dec. 29.	6.0	+ 9.6
Greenville, Miss.	478.3	88.83	do.	50.76	Feb. 11-14.	50.76	+	.01	Nov. 10, 11, 1893.	-2.55	do.	3.35	+ 5.90
Lake Providence, La.	542.3	69.77	do.	46.25	Feb. 15.	48.80	+	.55	Nov. 17, 1893.	-6.30	Dec. 30.	2.65	+ 7.95
Viola, Miss.	590.3	46.16	Apr. 16, 1897.	42.48	do.	58.53	+	1.37	Nov. 13, 14, 1893.	-6.5	Dec. 30, 31.	4.20	+ 10.70
St. Joseph, La.	648.3	33.15	Apr. 25, 1913.	40.48	do.	50.90	+	1.32	Nov. 13, 1895.	-9.3	Nov. 22.	1.10	+ 8.20
Natchez, Miss.	700.3	17.09	Apr. 27, 1913.	52.6	do.	53.5	+	.9	Nov. 13, 15, 1895.	-55	do.	6.54	+ 7.39
Red River Landing, La.	765.3	3.57	May 11, 12, 1912.	53.20	Mar. 2, 3.	52.45	-	.75	Nov. 13, 14, 1895.	-60	Oct. 30.	5.38	+ 5.98
Bayou Sara, La.	789.8	3.87	May 11, 1912.	47.37	Mar. 2	46.08	-	1.29	Nov. 15, 1895.	-2.8	Oct. 27, Nov. 2, 3.	.7	+ 3.5
Baton Rouge, La.	833.3	- .42	do.	43.82	Mar. 1, 2.	42.57	-	1.23	Nov. 14, 1894.	.45	Oct. 27, Nov. 25.	3.10	+ 2.65
Plaquemine, La.	854.1	.18	do.	36.38	Mar. 1.	34.80	-	.56	do.	- .94	Oct. 29.	1.50	+ 2.44
Donaldsonville, La.	885.4	- 1.01	May 10, 1912.	33.1	Feb. 29-Mar. 4.	34.0	-	1.1	Nov. 11, 1894.	1.00	Dec. 15.	2.2	+ 1.20
College Point, La.	904.5	.29	May 11, 1912.	30.18	Mar. 3, 4.	29.45	-	.73	Nov. 14, 1894.	.91	do.	.35	+ 1.24
Carrollton, La.	957	- .13	do.	21.06	do.	20.05	-	1.00	Dec. 27, 1872.	- 1.60	Dec. 12.	.10	+ .75
Algiers, La.	993	- 2.64	do.	20.8	Feb. 28, 29.	20.1	-	.7	Dec. 6, 1910.	1.95	Dec. 12, 15.	2.7	+ .9
Fort Jackson, La.	1,039	- 1.68	(May 8, 1913.) (Sept. 29, 1915.)	8.30 19.81	Mar. 1.	8.8	+	.5 .3	Dec. 7, 1893. Nov. 12, 14, 1894.	.3	Dec. 24, 25.	1.2	+ .9

NOTE.—High waters prior to 1890 are usually from old H. W. marks.

- 1 H. W. of 1870 would read 18.76 feet.
- 2 H. W. of 1881 would read 18.94 feet.
- 3 Keokuk dam effective after May, 1913.
- 4 Lowest reading during navigable season. The low water is now affected by dam and reads about 9.5 feet on gage.
- 5 The gage was drowned out by backwater of Keokuk dam and readings discontinued after May 31, 1913.
- 6 H. W. of June, 1844, would read 32.1 feet.
- 7 H. W. of June 28, 1844, would read 118.04 feet.
- 8 H. W. of July 4, 1844, would read 42.53 feet.
- 9 H. W. of July 4, 1844, would read 41.40 feet.
- 10 Gage transferred to New Madrid in 1883.
- 11 Due to storm.

TABLE NO. 1.—*Highest and lowest gauge readings, 1916*—Continued.
 TRIBUTARIES OF MISSISSIPPI RIVER AND THE ATCHAFALAYA.

River.	Station.	Approximate distance of station from— Gulf level.	Elevation of gauge zero above mean level.	Highest.			Lowest.			Difference compared with previous lowest.
				Prior to 1916.		1916.	Prior to 1916.		1916.	
				Date.	Gauge reading.	Date.	Gauge reading.	Date.	Gauge reading.	
Arkansas.	Little Rock, Ark.	Miles.	Feet.							
Do.	Pine Bluff, Ark.	176	222.06	May 21, 1892.	Feb. 2.	29.80	Sept. 9, 1913.	Nov. 17-21.	Feet.	+0.30
Atchafalaya.	Barbre Landing, La.	0	3.88	May 22, 1892.	Feb. 3.	20.0	Nov. 21-23, 1897.	Nov. 15-22.	3.2	+3.63
Do.	Simmesport, La.	5	5.79	May 11-15, 1912.	Mar. 3, 4.	52.00	Oct. 28, 1897.	Nov. 28.	3.90	+5.67
Do.	Melville, La.	31	0.44	May 13, 1912.	Mar. 1-6.	48.5	Nov. 8, 1891.	Nov. 29, 30.	6.6	+5.6
Cumberland.	Nashville, Tenn.	246	396.17	May 6-15, 1912.	Feb. 14.	43.0	Nov. 12, 13, 1894.	Oct. 16.	7.13	+7.53
Illinois.	Peoria, Ill.	160	428.52	Jan. 22, 1892.	Jan. 5.	42.40	Oct. 15, 16, 1878.	Sept. 27, 28, Oct. 3-5.	9.6	+9.60
Do.	Beardstown, Ill.	86	419.87	Mar. 28, 29, 1904.	Jan. 25.	23.1	1873; Aug. 5-12, 1875; Jan. 19-26, 1875.	Sept. 28, Oct. 2-19.	8.1	+8.4
Missouri.	Kansas City, Mo.	388	716.93	Feb. 25, 1893; Apr. 5, 6, 1913.	Feb. 1, 2.	20.7	Sept. 18, 19, 1879.	Dec. 20.	2.5	+2.3
Do.	Coles Creek, Mo.	107	413.54	June 1, 2, 1913.	July 15.	19.8	Dec. 5-9, 1898; Jan. 8, 1891.	Dec. 20.	2.5	+2.3
Do.	Hermann, Mo.	103	491.71	May 15, 1892.	June 9.	21.1	Dec. 21, 1897.	Dec. 27.	1.1	+1.85
Do.	St. Charles, Mo.	28	413.53	June 6, 1903.	June 9.	24.85	Dec. 21, 22, 1878.	Dec. 24, 25.	6.45	+1.92
Ohio.	Pittsburgh, Pa.	968	697.2	June 8, 1903.	do.	21.8	Dec. 26, 1879.	May 14.	2.5	+3.8
Do.	Cincinnati, Ohio.	498	428.26	Mar. 15, 1907.	Mar. 29.	53.5	Sept. 28, 1881.	Oct. 31.	2.8	+5.88
Do.	Louisville (upper), Ky.	304	402.53	Feb. 14, 1894.	Apr. 1.	31.2	do.	Dec. 19.	5.4	+4.3
Do.	Louisville (lower), Ky.	364	375.59	Feb. 16, 1894.	Jan. 15.	56.8	1896.	Dec. 19.	3.7	+2.7
Do.	Evansville, Ind.	179	329.18	do.	do.	43.6	do.	Oct. 2.	2.1	+2.6
Do.	Paducah, Ky.	43	286.26	Feb. 19, 1894.	Jan. 18.	45.7	Nov. 7, 8, 1895.	Oct. 20, 21.	3.3	+2.8
Do.	Cañon, Ark.	0	270.41	Apr. 7, 1913.	Jan. 15, 19.	40.6	Oct. 31-Nov. 4, 1895.	Nov. 17-22.	3.1	+1.30
Ouchita.	Cañon, Ark.	71.10	71.10	do.	Feb. 4.	53.21	1895.	Dec. 25.	5.80	+6.80
Do.	Monroe, La.	80.97	80.97	May 12, 1893.	Feb. 1.	39.0	Aug. 29, 30, 1897.	Oct. 12-17.	3.1	+1.30
Do.	Do.	Mo. Red Riv. 217	217	1874.	Feb. 19, 20.	40.6	Sept. 12-20, 1909.	Aug. 4.	3.9	+3.7

Red.	Fulton, Ark.	Month.	224.45	July 17, 1876.	35.75	Feb. 4.	31.95	- 2.80	Sept. 20-25, 1901. Sept. 25-30, 1901. Dec. 2-4, 1904.	.10	Nov. 19-21. Oct. 13. Oct. 16, 17. Oct. 17, 18, Nov. 1-20.	5.00	+4.90
Do.	Garland, Ark.	Mouth.	424	Mar. 24, 1864.	35.50	Feb. 10.	35.5	-10.40	Sept. 20-25, 1901. Sept. 25-30, 1901. Dec. 2-4, 1904.	-.20	Oct. 13.	5.5	.00
Do.	Shreveport, La.	Mouth.	306	August, 1840.	35.00	Feb. 10.	35.5	-10.40	Sept. 20-25, 1901. Sept. 25-30, 1901. Dec. 2-4, 1904.	-5.50	Oct. 16, 17.	1.90	+5.60
Do.	Alexandria, La.	Mouth.	118	July 6, 19' 8.	41.84	Feb. 16.	36.89	-4.95	Sept. 20, 1881.	-3.7	Oct. 17, 18, Nov. 1-20.	1.1	+1.15
St. Francis.	Bridge St. L. I. M. & S. R.	Mouth.	100	Apr. 4-6, 1897.	41.6	Feb. 9-12.	29.6	-12.0	Nov. 2-11, 1901.	-.05			
Do.	Wittsburg, Ark.	Mouth.	86	Apr. 28, 1896.	42.02				Oct. 27-31, Nov. 1-14, 1892.	-3.60			
Tennessee.	Chattanooga, Tenn.	Calro.	509	Mar. 11, 1867.	55.6	Jan. 1.	192.9	-25.7	Sept. 11-14, 1881; Sept. 19, 1883.	.00	Aug. 30, 31.	11 6.8	+6.80
Do.	Florence, Ala.	Calro.	301	Mar. 19, 1867.	32.20	July 12, 13.	20.46	-11.74	Oct. 24, 28, 1872; Sept. 18, 1873.	-.76	Oct. 1, 2, 14, 15, Nov. 14-16.	.16	+ .92
Do.	Johnsonville, Tenn.	Calro.	141	1882; Mar. 24, 1897.	48.0	Jan. 8.	32.5	-15.5	Oct. 2-20-Nov. 4, 1904.	-.9	Nov. 16-20.	1.3	+2.2
Wabash.	Mount Carmel, Ill.	Calro.	221	Mar. 30, 1913.	31.0	Feb. 6, 7.	28.5	-4.5	Nov. 7-23, 1895.	-.2	Oct. 11-18.	1.2	+1.4
White.	Jacksonport, Ark.	Mouth.	264	Aug. 23, 1915.	33.96	Feb. 1.	33.90	-.06	Dec. 24, 1872.	-1.10	Oct. 31-Nov. 7.	35	+1.45
Do.	Clarendon, Ark.	Mouth.	100	Mar. 20, 1880.	36.63	Feb. 7.	38.43	+1.80	Nov. 22, 1887.	4.07	Nov. 5.	6.28	+2.21
Yazoo.	Yazoo City, Miss.	Mouth.	65	1882.	36.50	Feb. 18.	29.9	-6.60	1875.	-4.30	Nov. 21, 22.	2.0	+2.30

* Discontinued.

* H. W. of June, 1844, would read 35.6 feet.

* H. W. of June, 1844, would read 39.57 feet.

* Stages below 5 feet affected by Davis Island Dam.

* Mouth of Red River is assumed to be at junction with Mississippi River.

* Stages affected by dam and power plant. See descriptive text.

* Record from May, 1892, to December, 1905, in part only.

* Readings below 30 feet discontinued Jan. 16, 1915.

* Low stage affected by dam.

* H. W. of June, 1844 would read 37.0 feet.

* Jan. 6, 1874, gauge read -0.1; probably affected by ice.

3488 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

TABLE No. 2.—Highest gauge readings, Mississippi River and tributaries, in 1917 to June 30.

[See Table No. 1 for previous highest known readings.]

River.	Station.	Date, 1917.	Gage readings.
			<i>Feet.</i>
Mississippi.....	St. Paul, Minn.....	Apr. 9.....	16.0
Do.....	Rock Island, Ill.....	Apr. 21-23.....	12.3
Do.....	Hannibal, Mo.....	June 9.....	18.1
Do.....	Grafton, Ill.....	June 14.....	22.9
Do.....	St. Louis, Mo.....	do.....	32.9
Do.....	Chester, Ill.....	June 15.....	30.7
Do.....	Grand Tower, Ill.....	June 16.....	33.4
Do.....	Cape Girardeau, Mo.....	do.....	34.2
Do.....	Calro, Ill. (Ohio River).....	Apr. 4-5.....	49.95
Do.....	Columbus, Ky.....	Apr. 5.....	45.75
Do.....	New Madrid, Mo.....	Apr. 5-6.....	39.33
Do.....	Cottonwood Point, Mo.....	Apr. 7-8.....	37.45
Do.....	Fulton, Tenn.....	Apr. 9.....	37.1
Do.....	Memphis, Tenn.....	Apr. 10.....	40.47
Do.....	Mhoen Landing, Miss.....	Apr. 10-12.....	42.33
Do.....	Helena, Ark.....	Apr. 12-13.....	49.60
Do.....	Sunflower Landing, Miss.....	Apr. 13-14.....	47.45
Do.....	Mouth White River, Ark.....	Apr. 15-18.....	51.57
Do.....	Arkansas City, Ark.....	Apr. 17-18.....	52.1
Do.....	Greenville, Miss.....	Apr. 19-21.....	45.70
Do.....	Lake Providence, La.....	Apr. 20-21.....	44.70
Do.....	Vicksburg, Miss.....	Apr. 23.....	49.98
Do.....	St. Joseph, La.....	Apr. 23-25.....	46.80
Do.....	Natchez, Miss.....	Apr. 25-27.....	49.9
Do.....	Red River Landing, La.....	Apr. 28.....	47.63
Do.....	Bayou Sara, La.....	Apr. 24-May 1.....	40.6
Do.....	Baton Rouge, La.....	Apr. 29-May 2.....	37.87
Do.....	Plaquemine, La.....	Apr. 26.....	33.61
Do.....	Donaldsonville, La.....	Apr. 24-26, 29-May 2.....	29.53
Do.....	College Point, La.....	May 1.....	25.23
Do.....	Carrollton, La.....	May 2.....	16.9
Do.....	Fort Jackson, La.....	May 7.....	7.7
Arkansas.....	Little Rock, Ark.....	June 12.....	16.29
Atchafalaya.....	Barbro Landing, La.....	May 1.....	44.95
Do.....	Melville, La.....	Apr. 30-May 2.....	39.6
Cumberland.....	Nashville, Tenn.....	Mar. 10.....	45.70
Illinois.....	Peoria, Ill.....	June 16.....	18.29
Missouri.....	Kansas City, Mo.....	June 9.....	26.5
Do.....	Hermann, Mo.....	June 13.....	24.7
Do.....	St. Charles, Mo.....	June 14.....	28.95
Ohio.....	Pittsburgh, Pa.....	Jan. 23.....	24.0
Do.....	Cincinnati, Ohio.....	Mar. 17.....	55.0
Do.....	Louisville, Ky. (upper).....	Mar. 9.....	25.0
Do.....	Louisville, Ky. (lower).....	do.....	50.6
Do.....	Evansville, Ind.....	Mar. 22.....	42.9
Do.....	Paducah, Ky.....	Mar. 26.....	47.1
Ouachita.....	Camden, Ark.....	Mar. 8.....	31.7
Do.....	Monroe, La.....	Apr. 9.....	28.4
Red.....	Fulton, Ark.....	May 1.....	20.1
Do.....	Shreveport, La.....	May 4.....	10.4
Do.....	Alexandria, La.....	May 6.....	18.50
St. Francis.....	Bridge, St. Louis, Iron Mountain & South- ern Ry.....	Apr. 13-15.....	23.9
Tennessee.....	Chattanooga, Tenn.....	Mar. 8.....	47.4
Do.....	Florence, Ala.....	Mar. 12.....	24.70
Do.....	Johnsonville, Tenn.....	Mar. 18.....	38.8
Wabash.....	Mount Carmel, Ill.....	June 12.....	22.6
White.....	Jacksonport, Ark.....	Apr. 6.....	25.0
Do.....	Clarendon, Ark.....	Apr. 20.....	27.60
Yazoo.....	Yazoo City, Miss.....	Apr. 29.....	29.6

TABLE No. 3.—Maximum heights above mean Gulf level at high-water and regular gauges on the Mississippi River from Cairo to the Passes during high water of 1917, with high waters of 1912 and 1913 for comparison.

Designation of gauge.	Distance below Cairo. ¹	Highest water of 1917.		Highest water of 1912 (elevation above mean Gulf level).	Difference between highest of 1917 and 1912	Highest water of 1913 (elevation above mean Gulf level).	Difference between highest of 1917 and 1913.
		Date.	Elevation above mean Gulf level.				
	Miles.		Feet.	Feet.	Feet.	Feet.	Feet.
Cairo	0	Apr. 4, 5	320.4	324.4	-4.0	325.1	-4.7
193	4.1	do	319.0	322.8	-3.8	323.3	-4.3
181	7.4	Apr. 5	317.7				
180	12.1	Apr. 4	316.1	319.4	-3.3	319.8	-3.7
179	16.9	do	314.7	317.2	-2.5		
Columbus	21.8	Apr. 5	312.2	315.5	-3.3	315.8	-3.6
178	27.7	do	309.7	313.1	-3.4	313.4	-3.7
177	33.0	do	308.4	311.5	-3.1		
176	38.4	Apr. 6	305.0	307.9	-2.9		
175	44.9	do	303.2	307.0	-3.8	307.4	-4.2
174	50.4	do	300.9	304.7	-3.8	304.8	-3.9
173	55.3	do	300.1	304.3	-4.2	303.8	-3.7
172	60.0	do	299.3	303.0	-3.7	303.3	-4.0
171	66.2	do	297.0			302.0	-5.0
New Madrid	71.1	Apr. 5, 6	295.3	300.1	-4.8	300.6	-5.3
170	76.0	Apr. 7	291.8	298.6	-6.8	299.1	-7.3
169	81.0	do	289.5	295.4	-5.9	296.5	-7.0
168	85.2	Apr. 6, 7	287.9	291.6	-3.7	292.2	-4.3
167	91.3	Apr. 5-7	284.5	287.9	-3.4	288.6	-4.1
166	96.5	Apr. 6	280.9	285.5	-4.6	285.8	-4.9
165	100.9	Apr. 6, 7	278.9	283.1	-4.2	283.3	-4.4
164	105.5		276.4	281.9	-5.5	282.4	-6.0
163	110.4	Apr. 7, 8	274.7	280.0	-5.3	280.1	-5.4
162	115.6	Apr. 8	272.4	277.7	-5.3	278.0	-5.6
161	120.4	do	269.6	274.4	-4.8	274.6	-5.0
Cottonwood Point	124.5	Apr. 7, 8	268.0	272.5	-4.5	272.8	-4.8
160	129.3	Apr. 8	265.3	271.3	-6.0	271.7	-6.4
159	132.9	Apr. 9	264.2	269.8	-5.6	269.9	-5.7
158	136.2	Apr. 8, 9	263.1	268.9	-5.8	268.8	-5.7
157	141.5	Apr. 10	261.0	266.6	-5.6	267.0	-6.0
156	148.2	Apr. 9, 10	257.6	263.9	-6.3	264.0	-6.4
155	154.7	Apr. 7-9	254.5	260.6	-6.1	261.3	-6.8
154	158.2	Apr. 9, 10	252.7	258.9	-6.2	259.5	-6.8
153	162.7	Apr. 9	250.9	257.7	-6.8	258.2	-7.3
152	168.8	Apr. 9, 10	248.7	255.5	-6.8	255.9	-7.2
151	172.7	Apr. 9	248.1	254.7	-6.6	254.7	-6.6
Fulton	175.4	do	245.8	252.0	-6.2	252.8	-7.0
150	180.3	Apr. 10	243.8	249.8	-6.0	250.5	-6.7
149	184.6		241.3				
148	192.2	Apr. 9, 10	239.0	245.5	-6.5	246.0	-6.1
147	197.6	do	237.8	243.2	-5.4	244.5	-6.7
146	204.7	do	234.7	240.3	-5.6	241.5	-6.8
145	209.0		232.8	238.8	-6.0	239.8	-7.0
144	214.1		229.2				
143	218.7	Apr. 9, 10	227.7			235.6	-7.9
142	224.5	Apr. 8, 9	225.6				
Memphis	227.0	Apr. 10	224.7	229.4	-4.7	230.8	-6.1
141	232.0	Apr. 9, 10	221.9			227.0	-5.1
140	236.0						
139	238.7	Apr. 11	219.0	221.6	-2.6	222.9	-3.9
138	247.0		215.7	218.0	-2.3	218.9	-3.2
137	253.6	Apr. 10	213.0	214.2	-1.2	214.8	-1.8
136	258.7	Apr. 9-11	210.0				
135	264.0	do	206.7	209.2	-2.5	209.6	-2.9
134	268.3	Apr. 10	205.7	207.5	-1.8		
Memphis Landing	273.2	Apr. 10-12	203.7	206.2	-2.5	206.6	-2.9
133	277.9	Apr. 11, 12	202.4	205.4	-3.0	205.0	-2.6
132	281.5	Apr. 12, 13	200.9	203.2	-2.3	203.3	-2.4
131	288.1		198.8	202.0	-3.2	202.2	-3.4
130	291.4		198.2(?)	201.2	-3.0	201.7	-3.5
129	297.5	Apr. 12, 13	195.4	200.9	-5.5	200.6	-5.2
128	301.0	Apr. 13	193.7	198.6	-4.9	198.9	-5.2
127	307.1	Apr. 12, 13	191.7	196.1	-4.4	197.0	-5.3
126	314.0	do	189.4	193.4	-4.0	195.0	-5.6
125	318.2	Apr. 13	187.3	192.8	-5.5	192.0	-4.7
124	324.9	do	185.1	188.2	-3.1	189.8	-4.7
123	329.3			186.6		187.2	
122	333.8	Apr. 12	182.0	183.6	-1.6	185.0	-3.0
121	336.6	do	180.0	182.0	-2.0		
120	343.1	Apr. 12, 13	178.0	180.8	-2.8	181.8	-3.8
119	347.1	Apr. 13	175.6	178.6	-2.9	179.6	-4.0

¹ Distances below Cairo are from the latest surveys.

TABLE NO. 3.—*Maximum heights above mean Gulf level at high-water and regular gauges on the Mississippi River, etc.*—(continued).

Designation of gaugs.	Dis- tance below Cairo. ¹	Highest water of 1917.		Highest water of 1912 (elevation above mean Gulf level).	Differ- ence be- tween highest of 1917 and 1912	Highest water of 1913 (elevation above mean Gulf level).	Differ- ence be- tween highest of 1917 and 1913
		Date.	Eleva- tion above mean Gulf level.				
	<i>Miles.</i>		<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>
Sunflower Landing.....	353.7	Apr. 13, 14.....	174.7	178.1	-3.4	178.5	-3.8
119.....	357.8	Apr. 14.....	172.6	176.5	-3.9	176.8	-4.2
118.....	362.8	do.....	171.2	175.1	-3.9	175.1	-3.9
117.....	366.5	Apr. 13.....	169.3	173.1	-3.8	173.0	-3.7
116.....	372.4		167.4			170.6	-3.2
115.....	375.6	Apr. 14-16.....	165.5	169.1	-2.6	168.2	-1.1
114.....	380.6	Apr. 14-17.....	164.3	168.6	-4.3	167.3	-1.0
113.....	386.5	Apr. 15-18.....	161.8	166.6	-4.8	165.7	-1.1
Mouth of White River.....	391.7	do.....	160.4	165.2	-4.8	164.2	-1.5
112.....	396.2	Apr. 16.....	158.9	163.8	-4.9	162.5	-1.4
111.....	399.2	Apr. 15-17.....	158.2	162.4	-4.2	161.6	-1.6
110.....	405.0		157.1			160.1	-1.9
109.....	408.4		156.2	159.8	-3.6		
108.....	413.9	Apr. 19.....	155.3	159.4	-4.1	158.8	-1.5
107.....	418.7			157.0		156.7	
106.....	424.3	Apr. 15-18.....	152.5	156.5	-4.0	155.5	-1.0
105.....	430.0		150.4	153.7	-3.3	153.6	-1.1
Arkansas City.....	436.7	Apr. 17-18.....	148.8	152.1	-3.3	151.9	-1.2
104.....	442.8		146.7	149.6	-2.9	149.5	-1.1
103.....	448.7	Apr. 17-19.....	145.3	148.6	-3.3	148.3	-1.4
102.....	453.0						
101.....	460.2	Apr. 17.....	141.5	145.1	-3.6	144.7	-1.4
100.....	464.1	Apr. 20.....	140.5	144.0	-3.5	144.1	-1.6
99.....	467.5	Apr. 21.....	139.8			143.6	-1.1
98.....	476.1	Apr. 18-20.....	136.7			141.2	-2.5
Greenville.....	480.2	Apr. 19-21.....	134.2	139.3	-5.1	139.0	-1.3
97.....	484.2	Apr. 20, 21.....	133.6	138.1	-4.5	137.9	-1.2
96.....	488.6	Apr. 21.....	132.6	137.0	-4.4	136.9	-1.7
95.....	490.9		131.4	136.1	-4.7	135.7	-1.2
94.....	497.0	Apr. 19, 20.....	129.2	133.8	-4.6	133.4	-1.4
93.....	502.6		127.6	132.1	-4.5	132.0	-1.5
92.....	507.5		126.1	130.5	-4.4	130.3	-1.2
91.....	512.1	Apr. 19-21.....	123.7	127.6	-3.9	127.4	-1.3
90.....	516.9	Apr. 19-20.....	122.7	126.2	-3.5	126.1	-1.6
89.....	522.9	Apr. 20.....	120.5	125.0	-4.5	124.6	-1.9
88.....	527.9		119.2	122.8	-3.6	122.8	-1.6
87.....	532.6	Apr. 19.....	117.5	121.0	-3.5	120.6	-1.9
86.....	537.7	Apr. 19-21.....	115.8	119.3	-3.5	118.8	-1.5
Lake Providence.....	542.0	Apr. 23, 21.....	114.5	118.0	-3.5	117.8	-1.7
85.....	546.0		113.8				
84.....	551.3	Apr. 19-20.....	112.1	114.6	-2.5		
83.....	556.9		109.8	113.0	-3.2	112.6	-1.2
82.....	560.8		103.2(?)			110.5	-1.7
81.....	563.8	Apr. 19-21.....	106.9				
80.....	574.9	Apr. 2, 21.....	103.8	105.6	-1.8	105.4	-1.6
79.....	579.3	do.....	102.4	104.5	-2.1	104.1	-1.7
78.....	585.1		101.0	103.7	-2.7	103.3	-2.3
77.....	592.0		98.8	101.0	-2.2	101.4	-2.6
76.....	596.0	Apr. 22-23.....	97.9				
Vicksburg.....	601.8	Apr. 23.....	96.1	97.8	-1.7	98.4	-2.3
75.....	603.3	Apr. 21-23.....	95.0	96.3	-1.3		
74.....	609.3	Apr. 21, 22.....	93.4	94.5	-1.1	95.4	-2.0
73.....	617.6	Apr. 22-24.....	91.8	92.2	-0.4		
72.....	624.8		90.1	91.8	-1.7	92.9	-2.8
71.....	631.7	Apr. 22-24.....	88.4	88.8	-0.4	90.3	-1.9
70.....	639.8			87.9		88.2	
69.....	646.0	Apr. 22, 23.....	84.3	86.4	-2.1	87.4	-3.1
68.....	651.6	Apr. 23, 24.....	82.8	84.5	-1.7	86.0	-3.2
67.....	657.2	Apr. 22-25.....	81.3	83.0	-1.7	84.3	-3.0
St. Joseph.....	662.2	do.....	80.0	81.8	-1.8	82.6	-2.6
66.....	670.1	Apr. 21-26.....	77.5			80.3	-2.8
65.....	675.2		75.6			78.4	-2.8
64.....	678.7	Apr. 20.....	75.0			77.6	-2.6
63.....	683.1		73.7(?)	76.0	-2.3	76.8	-3.2
62.....	687.4		73.1(?)			75.3	-2.3
61.....	693.8			72.6		73.9	-2.1
60.....	699.0		69.4	71.4	-2.0	72.6	-3.2
Natchez.....	705.7	Apr. 25-27.....	67.0	68.5	-1.5	69.7	-2.7
59.....	710.4		65.7	67.3	-1.6	68.3	-2.6
58.....	716.9	Apr. 24-26.....	64.1	66.3	-2.2	66.8	-2.7
57.....	720.9	Apr. 25-28.....	63.6	66.0	-2.4		

¹Distances below Cairo are from the latest surveys.

TABLE NO. 3.—*Maximum heights above mean Gulf level at high-water and regular gauges on the Mississippi River, etc.—Continued.*

Designation of gauge.	Distance below Cairo. ¹	Highest water of 1917.		Highest water of 1912 (elevation above mean Gulf level).	Difference between highest of 1917 and 1912	Highest water of 1913 (elevation above mean Gulf level).	Difference between highest of 1917 and 1913.
		Date.	Elevation above mean Gulf level.				
Natches—Continued.	Miles.		Feet.	Feet.	Feet.	Feet.	Feet.
56.	726.4		61.9	64.8	-2.9		
55.	732.2	Apr. 25.	60.4	63.9	-3.5	64.0	-3.6
54.	736.9	Apr. 26, 27.	59.0	62.3	-3.3	61.9	-2.9
53.	744.5		57.8	61.6	-3.8	60.9	-3.1
52.	750.2	Apr. 27.	56.6	60.6	-4.0	59.5	-2.9
51.	754.5		55.4(?)	60.0	-4.6	57.8	-2.4
50.	759.2	Apr. 27-30.	54.1	59.1	-5.0	56.8	-2.7
49.	763.1	Apr. 27-28.	52.1	58.1	-6.0	55.2	-3.1
48.	767.9	Apr. 25-29.	51.8	57.9	-6.1		
Red River Landing.	772.6	Apr. 28.	51.2	56.8	-5.6	54.1	-2.9
47.	776.9	do.	50.2	56.1	-5.9	53.3	-3.1
46.	780.1	Apr. 27-29.	49.9	55.6	-5.7	53.0	-3.1
45.	784.4	Apr. 29.	48.2	54.6	-6.4	51.9	-3.7
44.	792.2	Apr. 25-30.	47.5	54.0	-6.5	51.1	-3.6
43.	797.6	Apr. 28-30.	46.2	52.9	-6.7	50.0	-3.8
42.	802.1	May 1.	45.2	52.1	-6.9	49.2	-4.0
Bayou Sara.	806.9	Apr. 24-May 1.	44.5	51.2	-6.7	48.4	-3.9
41.	811.2	Apr. 28-29.	43.6	49.7	-6.1	47.2	-3.6
40.	814.9		42.1	49.2		46.7	
39.	819.6	Apr. 26-28.	42.1	48.1	-6.0	45.5	-3.4
38.	824.9	Apr. 29-May 1.	40.6	47.0	-6.4	44.3	-3.7
37.	829.8	Apr. 29-May 2.	39.9	46.0	-6.1	43.4	-3.5
36.	835.6	May 1.	38.0	44.1	-6.1	41.6	-3.6
Baton Rouge.	841.0	Apr. 29, May 2.	37.4	43.4	-6.0	40.9	-3.5
35.	846.8	Apr. 29.	36.5	42.2	-5.7	39.8	-3.3
34.	851.2	Apr. 24-28.	35.2	41.1	-5.9	38.8	-3.6
33.	857.4	Apr. 25-30.	34.0	39.8	-5.8	37.5	-3.5
Plaquemine.	861.0	Apr. 26.	33.8	39.6	-5.8	37.0	-3.2
32.	867.0	Apr. 25-26.	32.6	38.2	-5.6	35.8	-3.2
31.	871.4	Apr. 29-May 1.	31.8	37.2	-5.4	35.0	-3.2
30.	876.7	Apr. 29.	30.6	36.2	-5.6	33.9	-3.3
29.	881.1	Apr. 25, 30.	30.0	35.7	-5.7	33.3	-3.3
28.	886.2	Apr. 25.	29.5	35.0	-5.5	32.7	-3.2
Donaldsonville.	892.8	Apr. 24-26, 29-May 2.	28.5	34.1	-5.6	31.7	-3.2
27.	896.4	Apr. 24-26.	28.1	33.4	-5.3	31.2	-3.1
26.	902.1	Apr. 26-30.	27.0	32.4	-5.4	30.2	-3.2
25.	906.9	Apr. 30-May 1.	26.2	31.1	-4.9	29.1	-2.9
College Point.	910.6	May 1.	25.5	30.5	-5.0	28.5	-3.0
24.	918.0	Apr. 24, 26, 29.	24.3	29.5	-5.2	26.9	-2.6
23.	922.1	Apr. 24-26, 29-May 2.	23.8	28.5	-4.7	26.6	-2.8
22.	926.9	Apr. 30, May 2.	22.9	27.8	-4.4	25.5	-2.6
21.	933.0	Apr. 28, 25, 27.	21.1	25.6	-4.5	23.9	-2.8
20.	937.6	Apr. 24-May 1.	20.5	25.6	-5.0	23.1	-2.6
19.	942.2	May 2.	20.3	24.5	-4.2	22.8	-2.5
18.	945.2		19.4	23.5	-4.1	22.2	-2.8
17.	950.9		18.5	22.9	-4.5	21.3	-2.8
16.	955.0	May 1.	18.2	22.4	-4.2	20.8	-2.6
15.	960.5	Apr. 29.	17.3	21.0	-3.7	19.6	-2.3
Carrollton.	964.5	May 2.	16.8	20.9	-4.1	19.2	-2.4
Algiers.	974.6	Apr. 28, 29.	15.1	18.2	-3.1	17.0	-1.9
14.	978.0	May 3-5.	14.5	17.6	-3.1		
13.	981.5	Apr. 25.	13.5				
12.	987.4		12.6			14.8	-2.2
11.	991.9			14.9		13.9	
10.	996.8	Apr. 29, 30.	11.2	13.7	-2.5	12.8	-1.6
9.	1,001.2			12.7		12.0	
8.	1,007.1	May 3-5.	9.8	12.2	-2.4	11.4	-1.6
7.	1,011.9	Apr. 22-May 2, 3.	9.9				
6.	1,016.5	Apr. 28-May 5, 7.	8.8	10.8	-2.0	10.2	-1.4
5.	1,021.4	Apr. 28, 29.	9.0				
4.	1,026.8	May 4, 5.	7.8	9.5	-1.7	8.8	-1.0
3.	1,031.8	May 7.	7.5				
2.	1,036.6	May 5.	7.0	8.6	-1.6	8.1	-1.1
1.	1,041.7	do.	6.1	7.2	-1.2	7.0	-0.9
Fort Jackson.	1,046.8	May 7.	6.0	6.6	-0.6	6.6	-0.6
A.	1,052.0	May 5.	5.0	6.0	-1.0	5.7	-0.7
B.	1,056.1	May 4, 5.	4.8	5.2	-0.4	5.2	-0.4
C.	1,062.6	May 7.	4.7	4.7	0	4.5	+0.2

¹ Distances below Cairo are from the latest surveys.

TABLE NO. 4.—Cost of dredging operations, May 1, 1916, to Apr. 30, 1917.

Class of work, or plant to which distributed.	Labor.	Office supplies.	Subsistence.	Fuel.	Lighting supplies.	Lubricants.
Care of plant.....	\$41,291.21	\$97.32	\$9,495.27	\$8,066.53	\$348.56	\$207.85
Repairs to floating plant:						
Dredge Beta.....	477.07		151.74		2.02	4.13
Dredge Gamma.....	1,964.62		485.98		8.02	61.34
Dredge Delta.....	95.80		32.65			1.12
Dredge Epsilon.....	2,085.51		533.07		7.41	21.45
Dredge Zeta.....	466.42		112.05		3.26	8.00
Dredge Iota.....	2,431.17		643.05		11.17	217.24
Dredge Kappa.....	4,456.13		1,290.06		39.04	50.54
Dredge Henry Flad.....	6,383.88		1,616.37		35.90	124.06
Dredge B. M. Harrod.....	3,100.67	.13	841.89		28.65	12.92
Steamer Sechom.....	1,065.50		240.08		6.99	106.17
Steamer Choctaw.....	702.30	.66	177.01		2.30	12.02
Steamer Nokomis.....	167.62		39.60		.57	60.90
Steamer Wynoka.....	180.10		41.27			4.25
Steamer Leota.....	993.78		330.91		1.34	49.46
Steamer Inspector.....	1,749.50		461.84		12.95	47.43
Steamer Saturn.....	401.20		103.79		.19	27.36
Steamer Jupiter.....	893.05		239.49		15.37	42.43
Steamer Vulcan.....	390.20		83.12		6.02	31.66
Steamer Venus.....	651.76		153.38		4.60	9.75
Steamer Mars.....	1,168.82		263.99		4.88	9.24
Steamer Mercury.....	887.94	.33	186.79		.73	11.25
Pile sinker No. 13.....	68.76		21.46			1.30
Pile sinker No. 971.....	72.48		20.64			13.25
Pile sinker No. 981.....	226.43		38.30		.06	
Pile sinker No. 982.....	206.08		35.48			3.86
Pile sinker No. 983.....	97.19		26.50			3.71
Pump boat.....	18.08		4.06			
Barge No. 041.....	21.37		3.38			
Barge No. 051.....	184.00		41.14		2.06	
Skiffs.....	618.09		121.72			
Motor boat M. R. C. No. 2.....	27.72		8.46			
Floating derrick M. R. C. No. 1.....	213.24		50.91		1.79	24.60
Total.....	32,506.48	1.12	8,400.70		196.33	962.70
Operations during low-water season, 1916:						
Dredge Gamma.....	6,725.63	9.36	1,950.23	2,099.11	38.45	335.76
Dredge Iota.....	8,589.04	1.03	2,652.17	2,111.95	55.03	143.31
Dredge Kappa.....	9,609.62	16.41	2,634.36	3,978.18	72.68	506.55
Dredge B. M. Harrod.....	11,605.37	13.52	3,202.16	5,038.77	58.75	413.63
Steamer Inspector.....	6,999.18	.65	1,632.22	2,622.09	36.37	258.88
Steamer Saturn.....	2,695.41	31.66	691.62	629.27	26.19	45.54
Steamer Mercury.....	2,558.24	22.33	816.90	471.04	31.01	60.89
Steamer Venus.....	1,182.66	13.55	32.73	32.68	2.23	4.63
Steamer Mars.....	1,080.17	10.49	443.17	277.40	9.45	22.80
Total.....	49,845.42	118.92	14,415.86	17,260.49	319.21	1,775.99
Memphis Harbor.....	12,880.14	16.84	4,025.02	7,635.88	71.74	601.89
Wolf River diversion canal.....	21,796.48	30.25	6,183.73	11,981.47	87.83	873.00
Wolf River Dam.....	1,930.66		774.35	107.50		
Side-haul railway dry dock, repairs to.....	343.74		96.45		.27	24.40
Buildings and grounds.....	2,434.16		572.65		18.33	208.84
Outfit, care and repair of.....	4,502.16		1,113.62		2.93	.75
Miscellaneous:						
Handling materials.....	2,420.28		655.99		.95	.90
Buoys, construction of.....	375.54		91.72			
Total.....	2,795.82		747.71		.95	.90
Total cost of dredging operations.....	170,516.27	264.45	43,825.36	45,051.87	1,045.15	4,656.33

Class of work, or plant to which distributed.	Material.	Permanent plant and outfit.	Hire of plant and renewals.	Repairs (non-personal service and material).	Total.	Grand total.
Care of plant.....	\$597.55					\$60,204.29
Repairs to floating plant:						
Dredge Beta.....	247.53				\$892.48	
Dredge Gamma.....	630.96				3,150.02	
Dredge Delta.....	7.89				126.46	

TABLE No. 4.—Cost of dredging operations. May 1, 1916, to Apr. 30, 1917—Contd.

Class of work, or plant to which distributed.	Material.	Perma- nent plant and out- fit.	Hire of plant and renewals.	Repairs (non personal service and ma- terial).	Total.	Grand total.
Repairs to floating plant—Contd.						
Dredge Epsilon.....	\$405.41				\$3,252.85	
Dredge Zeta.....	26.56				617.96	
Dredge Zeta.....	678.08			\$5.50	4,181.16	
Dredge Kappa.....	1,667.62			2.50	17,997.29	
Dredge Henry Flad.....	2,374.68				0,474.88	
Dredge B. M. Harrod.....	646.82			1.00	4,631.58	
Steamer Schem.....	478.06				1,928.70	
Steamer Chocaw.....	385.37				1,290.66	
Steamer Nokomis.....	92.38				361.11	
Steamer W ynoka.....	112.77				338.30	
Steamer Lota.....	334.47				1,732.96	
Steamer Inspector.....	578.68				2,848.45	
Steamer Saturn.....	224.61				757.15	
Steamer Jupiter.....	455.92				1,646.31	
Steamer Vulcan.....	271.84				822.84	
Steamer Venus.....	170.27				989.76	
Steamer Mars.....	581.56				2,028.49	
Steamer Mercury.....	333.37				1,420.31	
Pile sinker No. 13.....	35.02				126.54	
Pile sinker No. 871.....	13.49				119.86	
Pile sinker No. 861.....	89.00				253.78	
Pile sinker No. 982.....	77.04				372.46	
Pile sinker No. 983.....	1.64				129.04	
Pump boat.....	8.00				37.16	
Barre No. 941.....	7.99				32.74	
Barre No. 051.....	91.31				318.53	
Skiffs.....	82.56				822.37	
Motor boat M. R. C. No. 2.....	.86				37.04	
Floating derrick M. R. C. No. 1.....	109.81				400.35	
Total.....	11,464.39			\$10.00	53,540.72	\$53,540.72
Operations during low-water season, 1916:						
Dredge Gamma.....	67.14				11,225.68	
Dredge Lota.....	\$33.96				13,696.49	
Dredge Kappa.....	433.48				17,453.28	
Dredge B. M. Harrod.....	318.84				20,676.04	
Steamer Inspector.....	148.44				11,686.72	
Steamer Saturn.....	164.68				4,424.56	
Steamer Mercury.....	196.77				4,147.28	
Steamer Venus.....	9.74				298.27	
Steamer Mars.....	28.60				1,872.08	
Total.....	1,731.55				85,470.44	85,470.44
Memphis Harbor.....	402.76		\$1,622.92		27,257.19	27,257.19
Wolf River diversion canal.....	958.86		\$,227.03	65.00	46,203.65	46,203.65
Wolf River Dam.....	613.53			13,147.61	10,573.55	10,573.55
Side-haul railway dry dock, repairs to.....	8.11				472.97	
Buildings and grounds.....	815.85				4,049.35	4,049.35
Outfit, care and repair of.....	\$15.87			18.50	6,073.83	6,073.83
Permanent outfit.....		99,955.04			9,955.04	9,955.04
Miscellaneous:						
Handling materials.....	20.84			231.42	3,337.39	
Booys, construction of.....	72.40				539.66	
	93.24			231.42	3,870.04	3,870.04
Total cost of dredging operations.....	17,081.24	9,955.04	5,849.95	13,472.43		313,671.08

TABLE No. 5.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1916.*

CAIRO TO MEMPHIS.

[NOTE.—The depths tabulated are merely those recorded by the inspection steamer in passing. No attempt was made to locate and record the minimum depth of water in the thalweg of the crossing.]

Name of crossing.	Miles below Cairo.	Dates of trips.					
		Aug. 8 to 9.	Aug. 16 to 17.	Aug. 29 to 31.	Sept. 5 to 8.	Sept. 12 to 14.	Sept. 19 to 21.
Cairo gauge.....	0	<i>Feet.</i> 18.8-18.3	<i>Feet.</i> 21.2-22.9	<i>Feet.</i> 18-15.4	<i>Feet.</i> 13.3-12.2	<i>Feet.</i> 11.6-11.2	<i>Feet.</i> 10.2-10
New Madrid gauge.....	70	14.9-14.4	15.6-17.7	14.4-12.5	10.7- 9.9	9.4- 9.2	8.4-8.3
Toneys.....	78	12	12	12		13	
Point Pleasant.....	80	13	12	12		9	
Darnells.....	82	12	11	11		11	
Bass.....	93				13	11	
Fritz.....	101						45
Hathaway.....	102			15			13
Sandy Hook.....	103	14	14		10	12	12
Gayoso.....	104					13½	15
Bells Point.....	112						12
Foot Island 16 (upper).....	121			15			
Foot Island 16 (lower).....	121	18	18		12	11	11
Head Island 18.....	122				14		
Cottonwood Point gauge.....	123	12.4-11.8	12.2-14.2	12.3-10	7.4-6.4	5.6-5.4	4.4-4.3
Mitchells.....	125				15	12	15
Island 20.....	128			15	11	11	10
Island 21, foot.....	131	15			14	11	9½
Blue Grass.....	132		15				
Wrights Point.....	135						13½
Hales Point.....	136					15	
River Styx.....	139		10		12	13	10½
Forked Deer.....	146				17		
Foot Island 26.....	153						
Foot Island 26, chute.....	153	11½		13	10	10	9
Round Lake.....	159	11	11	10½	9	17½	14
Head Island 30, chute.....	160				9		
Foot Island 30, chute.....	161				10½		
Plum Point.....	165					10	8
Drivers.....	169	12	10	12	9		
Yankee Bar (upper).....	170						
Yankee Bar (lower).....	171						
Fulton gauge.....	175	13-12.3	12.1-13.4	13-11.2	8.6-7.8	7.1-6.9	5.9-5.8
Sawmull Point.....	180				14	14	12
Island 34.....	180						
Morgans Point.....	181				14	18	17
Random Shot.....	196				15		11
Pecan Point.....	198						
Corona.....	204		15	18		11	10½
Happy Valley.....	206	18					
Old River.....	209				18		
Foot Island 40.....	220						
St. Clair.....	223				16		14
Ash Chute.....	225				12		
Loosehatchie.....	226					9½	
Paddys Hen.....	227						14
Memphis gauge.....	230	14.6-13.8	13-14	15-13	9.8-8.9	8.2-8	7.1-6.8

¹ Not controlling depth; 9 feet through chute of Island 30.

² At night, not in channel.

TABLE No. 5.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1916—Continued.*

CAIRO TO MEMPHIS—Continued.

Name of crossing.	Miles below Cairo.	Dates of trips.					
		Sept. 26 to 30.	Oct. 2 to 4.	Oct. 10 to 12.	Oct. 17 to 19.	Oct. 24 to 25.	Oct. 31 to Nov. 2.
		<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>
Cairo gauge.....	0	9.8-10.4	10.1-9.8	8.9-9.3	8.6-8.3	8.5-8.6	12.9-12.6
New Madrid gauge.....	70	7.9-8.3	8.2-7.9	7.2-7.3	6.8-6.7	6.6	9.2-9.6
Toneys.....	78		14				
Point Pleasant.....	80	11	12		8	10	
Darnells.....	82	11	11		8	9	12
Bass.....	93				12		12
Frits.....	101						
Hathaway.....	102		12		11		
Sandy Hook.....	103	12				12	12
Gayoso.....	104	13			11	10	
Bells Point.....	112		13				
Foot Island 18 (upper).....	121						
Foot Island 16 (lower).....	121	11	12½	10	9	10	12
Head Island 18.....	122		16				
Cottonwood Point gauge.....	123	3.9-4.1	4.2-3.9	3.2-3.1	2.8-2.7	2.4	4.7-5.8
Mitchells.....	125	14	14	12	12	13	13
Island 20.....	126	12	12	9	12	10	13
Foot Island 21.....	131	9	13	11	11	10	11
Blue Grass.....	132						
Wrights Point.....	135	9	15	11		11	11
Hales Point.....	136				13		
River Styx.....	139	11	8	12	9½	10	12
Forlind Deer.....	146						
Foot Island 26.....	153			10		11½	12
Foot Island 26, chute.....	153	14	13½		11		
Round Lake.....	159	10	11	11	9½	9½	11
Head Island 30, chute.....	160						
Foot Island 30, chute.....	161						
Puma Point.....	165	9	8				
Drivers.....	169			8	8	9	10
Yankee Bar (upper).....	170						
Yankee Bar (lower).....	171						
Fulton gauge.....	175	5.4-5.5	5.7-5.4	4.9-4.6	4.5-4.4	4.1	6-7.2
Sawmill Point.....	180	14	13	11	13	11	
Island 24.....	180						12
Morgan's Point.....	181						
Rando m Shot.....	196	12		10	8½	10½	
Pecan Point.....	198						
Carona.....	204	9	14	9	7	8	11
Centennial Point.....		10½	13				
Happy Valley.....	206						
Old River.....	209						
Foot Island 40.....	220		14				
St. Clair.....	223	12		12	11		12
Ash Chute.....	225						
Loonhatchie.....	226						
Paddy's Hen.....	227		13	13	11	11	12
Memphis gauge.....	230	6.5-6.4	6.6	6-5.7	5.6-5.5	5.1	6.5-7.9

1 Channel changing; map necessary to determine best water.

2 Dredge in channel.

3 Soundings taken at night; very dark and stormy.

4 Map showed 9 feet; crooked channel.

5 Not controlling depth.

3496 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

TABLE No. 5.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1916—Continued.*

CAIRO TO MEMPHIS—Continued.

Name of crossing.	Miles below Cairo.	Dates of trips.				
		Nov. 7 to 8.	Nov. 14 to 15.	Nov. 21 to 23.	Nov. 28 to 29.	Dec. 5 to 6.
Cairo gauge.....	0	<i>Feet.</i> 10.1-9.8	<i>Feet.</i> 8.8-9	<i>Feet.</i> 9.1-9.2	<i>Feet.</i> 9.6-9.5	<i>Feet.</i> 9.9-10.3
New Madrid gauge.....	70	7.8-7.5	6.7	6.8	7.1-7.0	7.1-7.3
Toneva.....	78					
Point Pleasant.....	80	11				
Darnells.....	82	11				
Bars.....	93					
Fritz.....	101					
Hathaway.....	102					
Sandy Hook.....	103	12				
Gavoso.....	104					
Bells Point.....	112					
Foot Island 16 (upper).....	121	11			11	
Foot Island 16 (lower).....	121	11	10			10½
Head Island 18.....	122					
Cottonwood Point gauge.....	123	4-3.6	2.7-2.6	2.6	3.0	3.9
Mitchells.....	125					
Island 20.....	128	12				
Foot Island 21.....	131				10½	
Blue Grass.....	132			11		
Wrights Point.....	135					
Hales Point.....	136					
River Strv.....	139	13	9	10½	10½	11
Forked Deer.....	146					
Foot Island 26.....	153	41				11
Foot Island 26, chute.....	153		9	12	11	
Round Lake.....	159	10	11	10½	11	11
Head Island 30, chute.....	160					
Foot Island 30, chute.....	161					
Plum Point.....	165					
Drivers.....	169	10	10			
Yankee Bar (upper).....	170				9	10½
Yankee Bar (lower).....	171					10½
Fulton gauge.....	175	6-5.4	4.4	4.5	4.7-4.8	4.8
Sawmill Point.....	180	14				
Island 34.....	180					
Morgans Point.....	181					
Random Shot.....	186					
Pecan Point.....	198					
Corona.....	204	11		10½	10½	10½
Happy Valley.....	206					
Old River.....	209					
Foot Island 40.....	220					
St. Clair.....	223	14				
Ash Chute.....	225					
Loonahatchie.....	226					
Paddys lien.....	227	14				
Memphis gauge.....	230	7-6.4	5.4-5.2	5.4	5.4-5.5	5.5

TABLE No. 5.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1916—Continued.*

MEMPHIS TO MHOON LANDING.

[NOTE.—The depths tabulated are merely those recorded by the inspection steamer in passing. No attempt was made to locate and record the minimum depth of water in the thalweg of the crossing.]

Name of crossing.	Miles below Cairo.	Dates of trips.						
		Sept. 4.	Sept. 11.	Sept. 18.	Sept. 23.	Oct. 2.	Oct. 7.	Oct. 14.
Memphis gauge.....	230	<i>Feet.</i> 10.3	<i>Feet.</i> 8.4	<i>Feet.</i> 7.3	<i>Feet.</i> 6.8	<i>Feet.</i> 6.6	<i>Feet.</i> 6.2	<i>Feet.</i> 5.7
Berkleys.....	237							
Wyanoke.....	238	14	12	14	12	13	11	11
Dismal Point.....	239							9
Enleys.....	241							
Head Josie Harry Chute.....	243	17	15	14				
Cashum.....	248	9	11	13	10	9	10	9
Cow Island.....	252			18		11	14	12
Cat Island.....	256			17½		10	10½	11
Mhoon Landing gauge.....	276	9.0	6.4	4.9	4.1	3.7	3.4	2.6

¹ At night.² Channel dredged to 10½ feet.

Name of crossing.	Miles below Cairo.	Dates of trips.					
		Oct. 21.	Oct. 28.	Nov. 4.	Nov. 11.	Nov. 18.	Nov. 25.
Memphis gauge.....	230	<i>Feet.</i> 5.4	<i>Feet.</i> 5.2	<i>Feet.</i> 8.1	<i>Feet.</i> 5.9	<i>Feet.</i> 5.2	<i>Feet.</i> 5.4
Berkleys.....	237					11	
Wyanoke.....	238	11	11	14	12	14	12
Dismal Point.....	239	10	10½	14	9		
Enleys.....	241					11	10
Head Josie Harry Chute.....	243						
Cashum.....	248	9	9	11	10	10½	10½
Cow Island.....	252	13	11	15	12	11	11
Cat Island.....	256	9½	9	16	12		
Mhoon Landing gauge.....	276	2.1	1.9	5.8	3.2	2.1	2.2

TABLE NO. 6.—*Dimensions of channel through bars, Mississippi River below Cairo, dredging season 1916, determined from surveys.*

Miles below Cairo.	Name of crossing.	Date of survey, 1916.	Least depth in channel 250 feet wide.	Least width of 9-foot channel.	Gauges and their readings at time of survey.		
					Readings.		Standard gauge at—
					Local gauge.	Standard gauge.	
			<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	
30	Medleys.....	Oct. 15.....	16	2,400	9.3	9.3	Columbus.
78	Toneys.....	Aug. 11.....	10.5	650	14.1	14.1	New Madrid.
		Aug. 28.....	13	1,000	14.8	15.1	
		Sept. 4.....	12.5	400	11.2	10.9	
		Sept. 13.....	11.5	550	9.8	9.3	
		Sept. 21.....	9.5	450	8.3	8.3	
		Oct. 24.....	12	850	6.7	6.6	
80	Point Pleasant.....	Aug. 12.....	13	(1)	13.8	14	Do.
		Aug. 20.....	14	(1)	12.8	13.4	
		Sept. 13.....	16	750	9.8	9.3	
		Sept. 20.....	10.5	700	8.5	8.4	
		Sept. 28.....	10.5	300	8.2	8.1	
		Oct. 6.....	11	400	7.7	7.7	
		Oct. 17.....	9	250	6.9	6.8	
		Nov. 2.....	13	600	9.7	9.6	
		Nov. 16.....	10.5	350	6.7	6.7	
		Nov. 25.....	10	400	6.8	6.8	
		Dec. 3.....	12	400	6.9	7.1	
82	Darnells.....	Aug. 17.....	18.5	(1)	17.1	17.4	Do.
		Sept. 4.....	9.5	800	11.2	10.9	
		Sept. 12.....	11	420	9.9	9.4	
		Sept. 25.....	11	280	8	7.9	
		Oct. 6.....	9	250	7.7	7.7	
		Oct. 21.....	8	200	6.7	6.6	
		Nov. 3.....	10.5	350	9.3	9.3	
		Nov. 17.....	9	250	6.7	6.9	
		Nov. 24.....	12	400	6.8	6.8	
		Dec. 1-2.....	10.5	700	6.9	6.9-7	
104	Gayoso.....	Sept. 9.....	11.5	1,100	6.4	6.2	Cottonwood Point.
		Sept. 16.....	14	400	5.5	5	
		Oct. 9.....	12.5	600	3.4	3.5	
		Nov. 19.....	10	475	3.7	2.8	
121	Island 16.....	Oct. 5.....	10.5	1,000	3.8	3.8	Do.
132	Blue Grass.....	Oct. 6.....	10	425	3.8	3.7	Do.
139	River Styx.....	Aug. 18.....	16.5	2,800	10.5	14.5	Fulton.
		Sept. 5.....	11	250	8.5	8.6	
		Oct. 7.....	11	500	5.5	5.2	
		Oct. 24.....	11	300	4.5	4.1	
		Dec. 10.....	13	1,000	6	5.9	
153	Island 26, foot.....	Sept. 6.....	8	125	8	8.4	Do.
		Sept. 17.....	9	250	6.5	6.2	
		Sept. 30.....	10.5	300	6	5.6	
		Dec. 6.....	12	800	5	4.8	
159	Round Lake.....	Aug. 28.....	12	1,400	13.5	13.7	Do.
		Sept. 18.....	10	275	6	6.1	
		Oct. 17.....	8.5	200	4.5	4.4	
		Nov. 5.....	12	300	6.5	6.7	
		Nov. 12.....	9.5	275	5	4.8	
		Dec. 5.....	9.5	300	5	4.8	
164	Osceola.....	Nov. 18.....	10.5	250	4.5	4.5	Do.
165	Plum Point.....	Sept. 12.....	9.5	400	7	7.1	Do.
167	Bullerton.....	Aug. 26.....	12.5	400	14.5	15.2	Do.
		Sept. 9-11.....	11.5	250	8	7.6-7.2	
		Oct. 9-10.....	8	200	5.5	5.0-4.9	
		Dec. 2.....	8	100	5	4.7	
170	Yankee Bar.....	Sept. 19.....	11	360	6	5.9	Do.
		Oct. 3.....	8.5	.....	6	5.6	
		Oct. 23.....	12	340	4	4.1	
		Dec. 22.....	8	100	4.5	4.4	
171	Flower Island.....	Oct. 21.....	11	350	4	4	Do.
		Nov. 14.....	10.5	370	4.5	4.4	
204	Corona.....	Nov. 9.....	11.5	1,300	6.5	6.3	Memphis.
		Dec. 13.....	13.5	(1)	7.5	7.4	
248	Coahoma.....	Aug. 31.....	13	1,120	12.5	13.2	Do.
		Sept. 23.....	9	250	6.5	6.4	
		Nov. 11.....	9.5	420	6	5.9	
252	Daisy.....	Oct. 2.....	12.5	660	6.5	6.7	Do.
256	Cat Island.....	Sept. 22.....	8	.....	7	6.8	Do.
		Sept. 29.....	9	250	6.5	6.4	
		Nov. 10.....	15.5	650	6.5	6	
333	Island 63.....	Oct. 14-15.....	15	600	5	5	Helena.
765	Angola and Smithland.	Oct. 26-27....	9	250	5.8	5.7-5.6	Red River Land- ing.

1 Unlimited.

TABLE NO. 7.—Summary of dredging operations, Mississippi River below Cairo during the low-water season of 1916.

GAMMA.

Points of operation.	Distribution of time.								Total.
	Placing plant.	Dredging.	Changing cuts.	Repairing.	Passing boats.	Making uptow.	Towing.	Not working awaiting lower stage, etc.	
Yankes Bar (170), Sept. 11-20	Hours. 7.30	Hours. 74.15	Hours. 3.25	Hours. 5.20	.....	Hours. 1.25	Hours. 173.00	Hours. 55.05	Hours. 290.00
Foot Island 26 (153), Sept. 20-27	2.55	79.15	9.35	13.10	0.20	7.45	7.45	50.15	171.00
West Memphis (232), Sept. 27-Oct. 30	.....	37.25	2.15	168.50	.....	.....	30.50	315.55	555.15
Yankes Bar (170), Dec. 5-8	2.10	13.25	.....	8.25	.....	7.00	46.20	.....	77.20
Luxora (161), lying up Dec. 8-21	.....	.....	.....	.....	.....	1.20	16.25	299.45	308.30
Going into winter quarters, Dec. 21-23	.....	.....	.....	.....	.....	1.40	24.40	35.40	62.00
Total and average	12.35	204.20	15.15	195.45	.20	19.10	199.00	747.40	1,394.05

IOTA.

Coahoma (248), Sept. 2-23	9.20	51.20	5.20	4.05	0.25	4.10	54.35	374.55	504.10
Cat Island (256), Sept. 23-Nov. 25	7.40	89.55	5.25	7.20	.....	3.35	3.10	1,394.35	1,611.40
West Memphis (232), lying up Nov. 25-Dec. 27	.....	.....	.....	.....	.....	2.00	13.45	763.15	779.00
Total and average	17.00	141.15	10.45	11.25	.25	9.45	71.30	2,532.45	2,794.50

KAPPA.

Bullerton (167), Aug. 9-13	8.20	34.55	3.50	42.45	0.30	.....	75.30	59.00	225.00
Ocoola (165), lying up Aug. 13-26	.....	.....	.....	.....	.....	.....	2.35	186.40	189.15
River Styx (139), Aug. 26-Sept. 1	2.10	93.25	6.45	7.20	.....	1.45	25.50	12.00	149.15
Round Lake (159), Sept. 1-25	4.45	132.45	15.45	224.40	2.10	3.45	4.55	216.15	605.00
Foot Island 26 (153), Sept. 25-29	7.40	25.40	5.25	1.05	.....	.....	16.30	.....	56.20
Luxora (161), lying up Sept. 29-Oct. 4	.....	.....	.....	.....	.....	6.30	8.10	116.00	130.40
Yankes Bar (170), Oct. 4-7	3.25	45.30	5.30	.....	1.40	.....	1.30	9.45	67.20
Luxora (161), lying up Oct. 7-11	.....	.....	.....	.....	.....	.....	4.10	98.00	102.10
Flower Island (171), Oct. 11-19	15.45	46.25	3.40	108.00	.....	1.15	1.45	11.40	188.30
Yankes Bar, upper (170), Oct. 19-22	1.00	38.25	7.20	.50	.....	.....	2.30	21.25	71.30
Luxora (161), lying up Oct. 22-Nov. 7	.....	.....	.....	.....	.....	.30	4.15	376.35	381.20
Round Lake (159), Nov. 7-10	.55	54.50	12.40	3.30	4.10	.....	1.00	.....	77.05
Luxora (161), lying up Nov. 10-29	.....	.....	.....	.....	.....	1.55	1.00	446.40	449.35
Going into winter quarters, Nov. 29-Dec. 6	.....	.....	.....	.....	.....	4.10	25.50	157.00	187.00
Total and average	44.10	471.55	60.55	388.10	8.30	19.50	175.30	1,711.00	2,890.00

¹ Includes 4 hours aground.

² Includes 24.10 hours cleaning boilers.

³ Dredging in front of marine ways.

⁴ Includes 1 hour wind bound and 8.40 hours

aground.

⁵ Includes 19.30 hours lost account short of labor.

⁶ Includes 27 hours cleaning boilers, 12 hours half

holiday, and 5.30 hours short of deck crew.

⁷ Includes 184.30 hours repairing boilers.

⁸ Includes 80.10 hours short of crew, 44.25 hours cleaning boilers, 36 hours holiday, 2.35 hours lost account fog.

⁹ Includes 12 hours short of crew.

¹⁰ Repairing suction and discharge pipe line.

¹¹ Short of firemen.

¹² Includes 12.05 hours short of firemen and 20 minutes lost account of storm.

TABLE NO. 7.—Summary of dredging operations, Mississippi River below Cairo during the low-water season of 1916—Continued.

B. M. HARROD.

Points of operation.	Distribution of time.								Total.
	Placing plant.	Dredging.	Changing cuts.	Repairing.	Passing boats.	Making uptow.	Towing.	Not working, awaiting lower stage, etc.	
Point Pleasant (80), lying up, Aug. 10-29.....	Hours.	Hours.	Hours.	Hours.	Hours.	Hours.	Hours.	Hours.	Hours.
Foot Toney's chute (78), Aug. 30-Sept. 3.....	3.35	62.50	3.20	1.00	1.30	10.00	1.45	1 20.10	104.10
Darnells (82), Sept. 3-9.....	6.20	77.00	2.35	.....	.45	1.45	1.25	1 51.15	141.05
Gayoso (104), Sept. 9-13.....	6.45	38.30	1.30	.....	1.25	3.00	6.30	1 45.15	102.55
Caruthersville (110), lying up, Sept. 13-18.....	.....	.....	.....	.....	.....	11.50	1.00	101.15	114.05
Darnells (82), second time, Sept. 18-23.....	4.30	58.50	2.30	.....	.....	.....	4 48.15	1 10.00	124.05
Point Pleasant (80), Sept. 23-29.....	4.00	61.20	1.40	1 45.00	.....	4.40	2.00	1 25.15	142.45
Caruthersville (110), lying up, Sept. 29-Oct. 11.....	.....	.....	.....	.....	.....	.....	3.45	298.00	301.45
Darnells (82), third time, Oct. 12-24.....	9.35	95.15	12.50	6.00	1.30	7.45	26.00	1 139.50	298.45
Point Pleasant (80), second time, Oct. 24-Nov. 8.....	2.00	21.25	1.20	33.15	.....	.....	1.00	303.48	362.45
Darnells (82), fourth time, Nov. 8-10.....	7.25	20.35	2.00	.....	.....	.....	.....	11.15	41.15
Caruthersville (110), lying up, Nov. 10-Dec. 21.....	.....	.....	.....	.....	.....	4.00	4.30	980.45	989.15
Going into winter quarters, Dec. 21-27.....	.....	.....	.....	.....	.....	2.30	67.15	86.15	156.00
Total and average.....	44.10	435.45	27.45	85.15	6.10	45.30	247.25	2,469.00	3,360.00

GAMMA.

Points of operation.	Distance towed.	Number of cuts.	Total length of cuts.	Average rate of advance per hour.	Depth suction lowered.	Average depth of cut.	Average steam pressure per square inch.	Average speed main pump, revolutions per minute.
Yankee Bar (170), Sept. 11-20.....	Miles. 65	9	Fect. 6,875	Fect. 93	Fect. 15	Fect. 6.3	Pounds. 139	142
Foot Island 26 (153), Sept. 20-27.....	14	19	13,825	174	16	5.1	140	143
West Memphis (232), Sept. 27-Oct. 20 ^a	79	8	3,575	96	15.5-16.5	6.3	140	145
Yankee Bar (170), Dec. 5-8.....	62	1	1,050	78	15	6.4	138	144
Luxora (161), lying up Dec. 8-21.....	9	.....	.....	.....	.....	.....	.....	.....
Going into winter quarters, Dec. 21-23.....	71	.....	.....	.....	.....	.....	.....	.....
Total and average.....	300	37	25,325	124	15-16.5	5.7	139	144

¹ Includes 12 hours half holiday.² Includes 24 hours holiday, 12.30 hours cleaning boilers, and 1.30 hours coaling steamer Inspector.³ Includes 24 hours cleaning boilers and 11.45 hours half holiday.⁴ Includes 15.15 hours aground and 4.30 hours coal barge aground.⁵ Short of labor.⁶ Repairing pontoons and cleaning boilers.⁷ Includes 7 hours delayed by high wind.⁸ Includes 18 hours short of labor and 3.45 hours pulling steamer Stacker Lee off ground.⁹ Dredging in front of marine ways.

TABLE NO. 7.—Summary of dredging operations, Mississippi River below Cairo during the low-water season of 1916—Continued.

IOTA.

Points of operation.	Distance towed.	Number of cuts.	Total length of cuts.	Average rate of advance per hour.	Depth suction lowered.	Average depth of cut.	Average steam pressure per square inch.	Average speed main pump, revolutions per minute.
Coahoma (249), Sept. 2-23.....	Miles. 16	8	Fect. 6,350	Fect. 124	Fect. 16-18	Fect. 5.6	Pounds. 110	153
Cat Island (256), Sept. 23-Nov. 25.....	8	9	20,325	226	14-17	5.3	136	160
West Memphis (232), lying up Nov. 25-Dec. 27.....	24							
Total and average.....	48	17	26,675	189	14-18	5.4	123	156

KAPPA.

Bullerton (167), Aug. 9-18.....	65	6	7,800	223	17	5.4	126	128
Oreola (165), lying up Aug. 18-26.....	2							
River Strz (139), Aug. 26-Sept. 1.....	26	10	21,350	229	18	4.8	123	128
Round Lake (159), Sept. 1-25.....	26	22	28,960	218	12-16	5.0	122	129
Peet Island 26 (153), Sept. 26-29.....	6	8	8,450	329	15	3.2	124	131
Luxora (161), lying up Sept. 29-Oct. 4.....	8							
Yankes Bar (170), Oct. 4-7.....	9	10	14,100	310	14-15	3.8	124	130
Luxora (161), lying up Oct. 7-11.....	9							
Flower Island (171), Oct. 11-19.....	10	10	11,625	250	14	4.8	124	130
Yankes Bar, upper (170), Oct. 19-22.....	1	8	9,625	248	14-15	5.4	125	131
Luxora (161), lying up Oct. 22-Nov. 7.....	9							
Round Lake (159), Nov. 7-10.....	2	12	17,850	316	15	3.4	122	120
Luxora (161), lying up Nov. 10-29.....	2							
Going into winter quarters, Nov. 29-Dec. 6.....	71							
Total and average.....	240	86	119,150	252	13-18	4.5	124	130

B. M. HARROD.

Point Pleasant (80), lying up, Aug. 10-29.....	152							
Fort Toney's (hute) (78), Aug. 30-Sept. 3.....	2	10	13,250	211	18	5.1	131	134
Darnells (82), Sept. 3-9.....	4	9	17,300	225	16-18	6.3	136	138
Gayoso (104), Sept. 9-13.....	22	7	7,800	203	18	6.5	134	134
Caruthersville (110), lying up, Sept. 13-18.....	6							
Darnells (82), second time, Sept. 18-23.....	28	7	13,900	236	15-17	6.6	136	135
Point Pleasant (80), Sept. 23-29.....	2	7	18,200	297	15-16	6.8	137	138
Caruthersville (110), lying up, Sept. 29-Oct. 11.....	30							
Darnells (82), third time, Oct. 12-24.....	28	14	25,400	267	15-17	5.8	136	135
Point Pleasant (80), second time, Oct. 24-Nov. 8.....	2	8	6,150	287	15-16	6.4	138	135
Darnells (82), fourth time, Nov. 8-10.....	2	7	6,250	304	15	5.0	140	136
Caruthersville (110), lying up, Nov. 10-Dec. 21.....	28							
Going into winter quarters, Dec. 21-27.....	122							
Total and average.....	428	69	108,250	248	15-18	6.1	136	136

APPENDIX 1A.

LAWS AFFECTING THE MISSISSIPPI RIVER COMMISSION, JULY 1, 1916, TO
JUNE 30, 1917.

[Public—No. 168—64th Congress.]

[H. R. 12198.]

AN ACT Making appropriations for the construction, repair, and preservation of certain public works on rivers and harbors, and for other purposes.

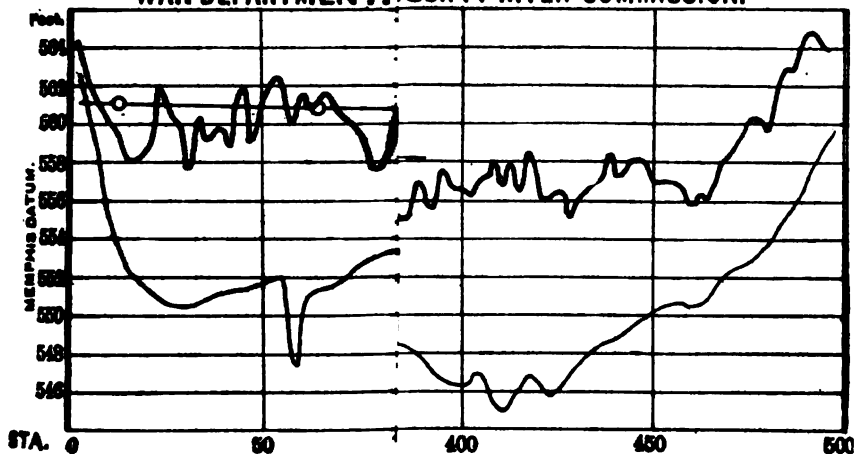
Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums of money be, and are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, to be immediately available, and to be expended under the direction of the Secretary of War and the supervision of the Chief of Engineers, for the construction, completion, repair, and preservation of the public works hereinafter named:

* * * * *

Mississippi River from Head of Passes to the mouth of the Ohio River, including salaries, clerical, office, traveling, and miscellaneous expenses of the Mississippi River Commission: Continuing improvement with a view to securing a permanent channel depth of nine feet, \$6,000,000, which sum shall be expended under the direction of the Secretary of War in accordance with the plans, specifications, and recommendations of the Mississippi River Commission, as approved by the Chief of Engineers, for the general improvement of the river, for the building of levees, and which may be done, in the discretion of the Secretary of War, by hired labor or otherwise, between Head of Passes and Cape Girardeau, Missouri, and for surveys, including the survey from Head of Passes to the headwaters of the river, in such manner as in their opinion shall best improve navigation and promote the interests of commerce at all stages of the river: *Provided*, That of the money hereby appropriated so much as may be necessary shall be expended in the construction of suitable and necessary dredge boats and other devices and appliances and in the maintenance and operation of the same: *Provided further*, That the watercourses connected with said river and the harbors upon it, now under the control of the Mississippi River Commission and under improvement, together with the harbor at Vicksburg, Mississippi, and the Ohio River from its mouth to the mouth of the Cache River, which are hereby transferred to and placed under the control and jurisdiction of such commission, may, in the discretion of said commission, upon approval by the Chief of Engineers, receive allotments for improvements now under way or hereafter to be undertaken, to be paid for from the amount herein appropriated: *Provided further*, That the report of the Mississippi River Commission, contained in House Document Numbered Six hundred and sixty-seven, Sixty-third Congress, second session, shall not be construed as a project requiring special congressional action: *Provided further*, That no part of the improvement of the Ohio River, with a view to the construction of locks and dams, shall be considered as transferred to or placed under the control and jurisdiction of the Mississippi River Commission: *Provided further*, That a survey with a report shall be made by the Mississippi River Commission of the Atchafalaya River in accordance with the general plan of said commission for the improvement of the Mississippi River, and in making such survey and report, if in their opinion the improvement of the Atchafalaya is desirable, consideration shall be given and recommendation made as to any plans for cooperation on the part of local interests.

The jurisdiction of the Mississippi River Commission is hereby extended so as to include that part of the Arkansas River between its mouth and the intersection thereof with the division line between Lincoln and Jefferson Counties, and any funds which are herein or may be hereafter appropriated by Congress for improving the Mississippi River between Head of Passes and the mouth of the Ohio River, and which may be allotted to levees and bank revetment, may be expended within the limits of said extended jurisdiction under the direction of the Secretary of War, in accordance with the plans, specifications, and recommendations of the Mississippi River Commission, as approved by the Chief of Engineers, and upon like terms and conditions for levees and

WAR DEPARTMENT. MISSISSIPPI RIVER COMMISSION.



NOTES.

CAIRO, MO. AND ROCK ISLAND, ILL.

Levee from Sta. 2 to 392 is along the DISTRICT LEVEE

Levee from Sta. 392 to 500 is along the 8 MILES ABOVE CAIRO

SCALE, FEET.

10,000

15,000

LEGEND

company my Annual Report for 1917:

Top of Levee.

Inside Ground Line.

Established M.R.C. Grade.

18751—ENG 1917. (To face page)

Charles Smith

Major, Corps of Engineers, U.S. Army,
Secretary Mississippi River Commission.

THESE



TABLE

THE RESULTS OF THE EXPERIMENTAL
WORK ON THE EFFECT OF THE

OF THE

THE RESULTS OF THE EXPERIMENTAL

THE RESULTS OF THE EXPERIMENTAL

THE RESULTS OF THE EXPERIMENTAL

THE RESULTS OF THE EXPERIMENTAL

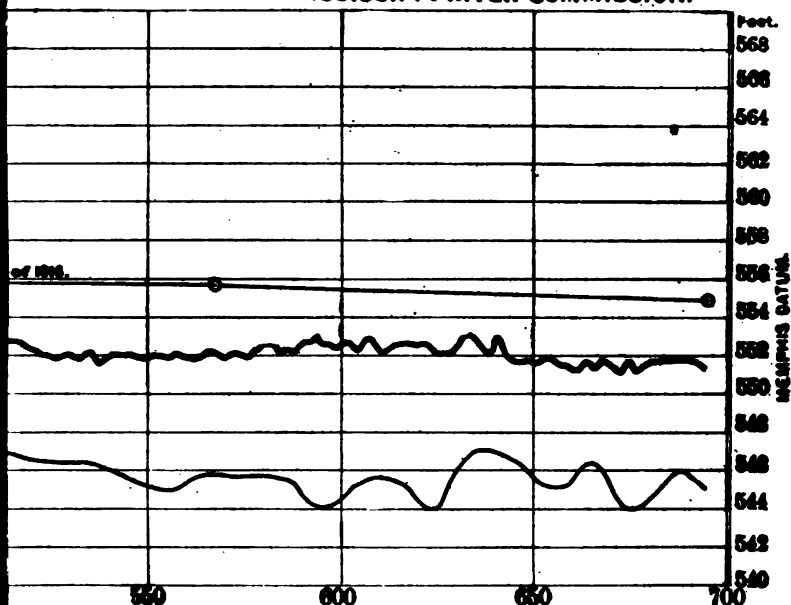
THE RESULTS OF THE EXPERIMENTAL

THE RESULTS OF THE EXPERIMENTAL

THE RESULTS OF THE EXPERIMENTAL

THE RESULTS OF THE EXPERIMENTAL

MISSISSIPPI RIVER COMMISSION.



**BETWEEN CAPE CHARDEAN, MO. AND ROCK ISLAND, ILL.
MUSCATINE ISLAND LEVEE**

RIGHT BANK, 481 TO 487 MILES ABOVE CAIRO.

HORIZ. SCALE, FEET.

5,000 10,000 15,000

To accompany my Annual Report for 1917:

AS,

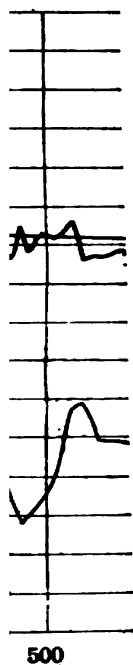
govern.

June, 1917.

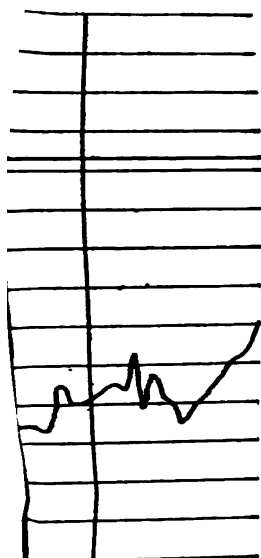
Charles Smith

Major, Corps of Engineers, U.S. Army,

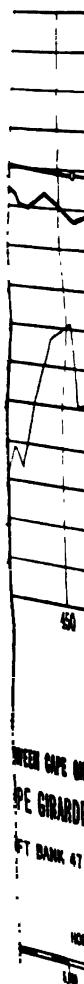
Secretary Mississippi River Commission.



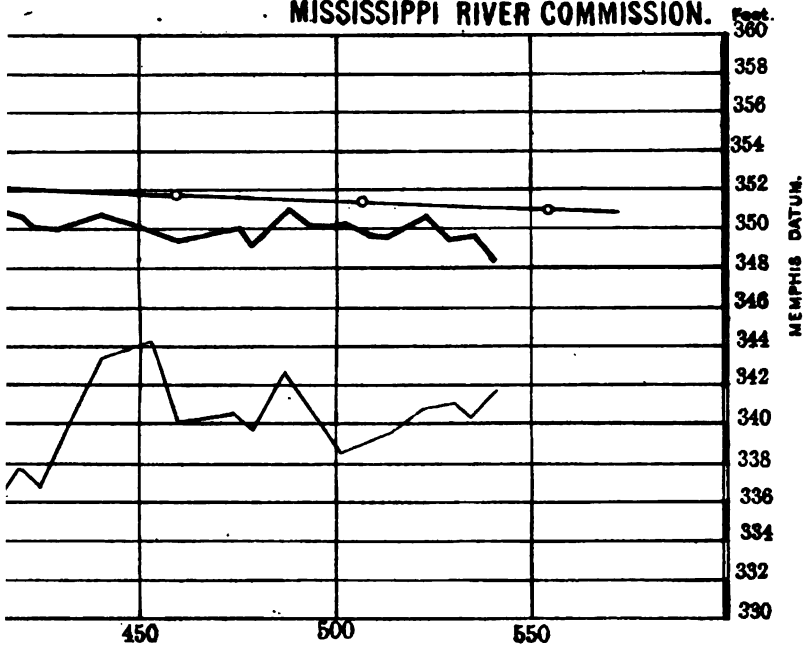
500



450

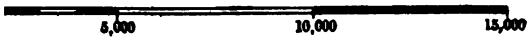


MISSISSIPPI RIVER COMMISSION.



WEEN CAPE GIRARDEAU, MO. AND ROCK ISLAND, ILL.
 PE GIRARDEAU AND CLEAR CREEK LEVEE
 FT BANK: 47 TO 60 MILES ABOVE CAIRO.

HORIZ. SCALE, FEET.



To accompany my Annual Report for 1917:

Charles Smith

Major, Corps of Engineers, U. S. Army,

Secretary Mississippi River Commission.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200

201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300



FEES BETW

LOC



ted:

Thomas
Assistant I

by S.J.C.

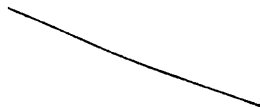


**AND ROCK ISLAND
PROJECTS
FOR**

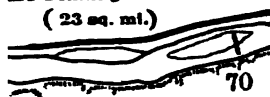
my Annual R

W. S. Brown
Corps of Engineers
retary, Mississippi

N



Preston Levee
and Drainage District.
(23 sq. mi.)



AND ROCK ISLAND, ILL.
PROJECTS
ES



ny my Annual Report for

W. D. Smith

or, Corps of Engineers, U.S. Ar
Secretary, Mississippi River

bank revetment upon any part of the Mississippi River now under the jurisdiction of said commission, and in such manner as will best promote and accomplish the purposes for which commission was created, in so far as the territory hereby added to its said jurisdiction may be involved.

Any funds which are herein, or may hereafter be, appropriated by Congress for improving the Mississippi River between Head of Passes and the mouth of the Ohio River, and which may be allotted to levees, may be expended, under the direction of the Secretary of War, in accordance with the plans, specifications, and recommendations of the Mississippi River Commission, as approved by the Chief of Engineers, for levees upon any part of said river between Head of Passes and Rock Island, Illinois, in such manner as, in their opinion, shall best improve navigation and promote the interest of commerce at all stages of the river.

Sec. 6. That no part of the funds herein appropriated shall be used to pay for any work done by private contract if the contract price is more than twenty-five per centum in excess of the estimated cost of doing the work by Government plant.

Approved July 27, 1916.

[Public—No. 367—64th Congress.]

[H. R. 14777.]

AN ACT To provide for the control of the floods of the Mississippi River and of the Sacramento River, California, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That for controlling the floods of the Mississippi River and continuing its improvement from the Head of the Passes to the mouth of the Ohio River the Secretary of War is hereby empowered, authorized, and directed to carry on continuously, by hired labor or otherwise, the plans of the Mississippi River Commission heretofore or hereafter adopted, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate \$45,000,000: *Provided*, That not more than \$10,000,000 shall be expended therefor during any one fiscal year.

(a) All money appropriated under authority of this section shall be expended under the direction of the Secretary of War in accordance with the plans, specifications, and recommendations of the Mississippi River Commission as approved by the Chief of Engineers, for controlling the floods and for the general improvement of the Mississippi River, and for surveys, including the survey from the Head of the Passes to the headwaters of the river, and a survey of the Atchafalaya Outlet so far as may be necessary to determine the cost of protecting its basin from the flood waters of the Mississippi River either by its divorcement from the Mississippi River or by other means, and for salaries, clerical, office, traveling, and miscellaneous expenses of the Mississippi River Commission.

(b) That no money appropriated under authority of this section shall be expended in the construction or repair of any levee unless and until assurances have been given satisfactory to the commission that local interests protected thereby will contribute for such construction and repair a sum which the commission shall determine to be just and equitable, but which shall not be less than one-half of such sum as may have been allotted by the commission for such work: *Provided*, That such contributions shall be expended under the direction of the commission, or in such manner as it may require or approve, but no contribution made by any State or levee district shall be expended in any other State or levee district except with the approval of the authorities of the State or district so contributing.

(c) Any funds which may hereafter be appropriated under authority of this act for improving the Mississippi River between the Head of the Passes and the mouth of the Ohio River, and which may be allotted to levees, may be expended upon any part of said river between the Head of the Passes and Rock Island, Illinois.

(d) No money appropriated under authority of this act shall be expended in payment for any right of way for any levee which may be constructed in cooperation with any State or levee district under authority of this act, but all such

rights of way shall be provided free of cost to the United States: *Provided*, That no money paid or expense incurred by any State or levee district in securing such rights of way, or in any temporary works of emergency during an impending flood, or for the maintenance of any levee line, shall be computed as a part of the contribution of such State or levee district toward the construction or repair of any levee within the meaning of paragraph (b) of this section.

That the watercourses connected with the Mississippi River to such extent as may be necessary to exclude the flood waters from the upper limits of any delta basin, together with the Ohio River from its mouth to the mouth of the Cache River, may, in the discretion of said commission, receive allotments for improvements now under way or hereafter to be undertaken.

Upon the completion of any levee constructed for flood control under authority of this act said levee shall be turned over to the levee district protected thereby for maintenance thereafter; but for all other purposes the United States shall retain such control over the same as it may have the right to exercise upon such completion.

* * * * *

GENERAL PROVISIONS.

SEC. 3. That all the provisions of existing law relating to examinations and surveys and to works of improvement of rivers and harbors shall apply, so far as applicable, to examinations and surveys and to works of improvement relating to flood control. And all expenditures of funds hereafter appropriated for works and projects relating to flood control shall be made in accordance with and subject to the law governing the disbursement and expenditure of funds appropriated for the improvement of rivers and harbors.

All examinations and surveys of projects relating to flood control shall include a comprehensive study of the watershed or watersheds, and the report thereon, in addition to any other matter upon which a report is required, shall give such data as it may be practicable to secure in regard to (a) the extent and character of the area to be affected by the proposed improvement, (b) the probable effect upon any navigable water or waterway, (c) the possible economical development and utilization of water power, and (d) such other uses as may be properly related to or coordinated with the project. And the heads of the several departments of the Government may, in their discretion, and shall upon the request of the Secretary of War, detail representatives from their respective departments to assist the Engineers of the Army in the study and examination of such watersheds, to the end that duplication of work may be avoided and the various services of the Government economically coordinated therein: *Provided*, That all reports on preliminary examinations hereafter authorized, together with the report of the Board of Engineers for Rivers and Harbors thereon and the separate report of the representative of any other department, shall be submitted to the Secretary of War by the Chief of Engineers, with his recommendations, and shall be transmitted by the Secretary of War to the House of Representatives, and are hereby ordered to be printed when so made.

In the consideration of all works and projects relating to flood control which may be submitted to the Board of Engineers for Rivers and Harbors for consideration and recommendation, said board shall, in addition to any other matters upon which it may be required to report, state its opinion as to (a) what Federal interest, if any, is involved in the proposed improvement; (b) what share of the expense, if any, should be borne by the United States; and (c) the advisability of adopting the project.

All examinations and reports which may now be made by the Board of Engineers for Rivers and Harbors upon request of the Committee on Rivers and Harbors relating to works or projects of navigation shall in like manner be made upon request of the Committee on Flood Control on all works and projects relating to flood control.

SEC. 4. That the salary of the civilian members of the Mississippi River Commission shall hereafter be \$5,000 per annum.

Approved, March 1, 1917.

[Public, No. 21—65th Congress.]

[H. R. 11.]

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and eighteen, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are appropriated,

out of any money in the Treasury not otherwise appropriated, for the fiscal year ending June thirtieth, nineteen hundred and eighteen, namely:

ENGINEER DEPARTMENT.

For prosecuting work of flood control in accordance with the provisions of the flood-control act approved March first, nineteen hundred and seventeen, \$8,000,000.

Approved, June 12, 1917.

APPENDIX 2.

IMPROVING MISSISSIPPI RIVER, FIRST AND SECOND DISTRICTS.

The first district extends from Cape Girardeau, Mo., to the foot of Island 40, a distance of 270 miles. The second district extends from foot of Island 40 to the mouth of White River, a distance of 173 miles.

District headquarters: Memphis, Tenn.

District officer: Lieut. Col. G. P. Howell, Corps of Engineers, United States Army.

WORKS.

I. Revetments:

- (a) Columbus, Ky.
- (b) Hickman, Ky.
- (c) Slough Landing Neck, Tenn.
- (d) New Madrid, Mo.
- (e) Gayoso Bend, Mo.
- (f) Caruthersville, Mo.
- (g) Barfield, Ark.
- (h) Plum Point Reach, Ark. and Tenn.
- (i) Golden Lake, Ark.
- (j) Hopefield Bend, Ark.
- (k) Memphis Harbor, Tenn.
- (l) Star Landing, Miss.
- (m) Porter Lake, Ark.
- (n) Walnut Bend, Ark.

I. Revetments—Continued.

- (o) Trotters, Miss.
- (p) Helena, Ark.
- (q) Delta, Miss.
- (r) Oldtown, Ark.
- (s) Sunflower, Miss.

II. Experimental revetment.

III. Wolf River.

IV. Levees:

- (a) Upper St. Francis district.
- (b) Reelfoot district.
- (c) Lower St. Francis district.
- (d) Upper Yazoo district.
- (e) White River district.

V. Surveys.

VI. Plant.

I. REVETMENTS.

(a) Columbus, Ky.

Location.—Twenty-one miles below Cairo, left bank.

Original condition.—For some years prior to 1890 the river bank in front of Columbus was subjected to more or less active caving, finally resulting in the necessity of fixing the channel and of preventing further encroachment upon the town, whose river-front property was already in close proximity to the bank.

Previous projects.—None.

Existing project.—The existing project was adopted in 1889 and contemplated the installation of submerged revetment dikes along the Columbus front.

Operations and results prior to the fiscal year.—During the years 1889 and 1890 five submerged revetment dikes were placed about 500 feet apart, at a total cost of \$43,750.

The result has been a stable bank in this locality throughout the interval between extreme dikes; namely, 2,200 feet, and for a considerable distance below the downstream dike.

Operations and results during the fiscal year.—None.

Condition at the end of fiscal year.—All dikes are in effective condition and suggest no probable need of further expenditure.

Local cooperation.—None.

Effect of improvement.—The river channel in the vicinity of Columbus has been fixed, and the town protected from its further encroachments. The bank between dikes and for some distance below has been maintained.

Proposed operations.—None.

(b) *Hickman, Ky.*

Location.—Thirty-six miles below Cairo, left bank.

Original condition.—Throughout the eighties active caving was in progress along the Hickman River front, to the extent that in the year 1889 it became necessary to initiate revetment for the maintenance of the Hickman Harbor and for the protection of its river-front property.

Previous projects.—None.

Existing project.—The existing project, adopted in 1889, provided for the revetment of the caving bank, to the end of holding the river channel in its then position and of preventing threatened destruction of town property.

Operations and results prior to the fiscal year.—About 1,400 feet of continuous standard fascine revetment were installed in 1889, 1892, and 1894. The total expenditure has amounted to \$95,132, of which \$92,595.46 pertained to new construction and \$2,536.54 to repairs.

Operations and results during the fiscal year.—None.

Condition at the end of fiscal year.—The revetment throughout is in good condition. No change of any consequence has occurred since last report.

Local cooperation.—None.

Effect of improvement.—The town of Hickman has been guarded against serious property loss; its river slope has been made stable and the channel, in front of the town, has been permanently located.

Proposed operations.—None.

(c) *Slough Landing Neck, Tenn.*

Location.—Sixty-eight to eighty miles below Cairo, left bank.

Original condition.—This is a long, narrow point of land around which the Mississippi River flows, making acute bends on the upper and lower sides. Active bank caving had been in progress in both bends for a number of years, resulting in a progressive diminution of the distance across the neck. Moreover, incident to the extreme floods of 1912 and 1913, marked surface scour developed from rapid crossflow, thereby bringing into question a serious hazard of cut-off, the effect of which would be a disturbance of river conditions over a period of years and for many miles above and below the neck.

Previous projects.—None.

Existing project.—The existing project was adopted in 1913 to eliminate the danger of cut-off by the revetment of the bends to prevent further bank loss and by the construction of a levee or dike along the neck to check crossflow and surface scour during the higher river stages.

Operations and results prior to the fiscal year.—The work accomplished prior to the present year consisted in the installation in the upstream bend of standard willow fascine revetment and upper bank pavement. This resulted in the protection against further erosion of 15,600 linear feet of bank, at a cost of \$634,150.65 for new work and \$9,885.35 for repairs.

In addition to the foregoing a levee or dike about 8 miles in length, containing 849,541 cubic yards, was constructed along the axis of the neck, at a cost of \$112,100, with the object of preventing continued surface cut-off.

Operations and results during the fiscal year.—The revetment of the upper bend has been extended downstream for a distance of 764 feet, and in addition the upper bank along a stretch of about 1,200 feet of the last season's work was paved. The work was in progress at the end of the last fiscal year and completed on July 18, 1916, when the plant was towed to Gayoso, Mo., for operation at that point.

The foregoing operations were accomplished by hired labor with Government plant at a total cost of \$45,205.18.

The following table gives detailed costs:

SLOUGH LANDING NECK (68 L.), FIRST AND SECOND DISTRICTS.

Mattresses, total area, 2,106 squares; channel mats, 91 per cent; connecting mats, 9 per cent.

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$300.00		\$0.143
1-inch strand.....pounds.....	13,000	903.25	6.172	.429
1-inch strand.....do.....	4,400	241.00	2.089	.116
1-inch strand.....do.....	14,800	946.20	7.027	.440
Wire, No. 9.....do.....	5,800	218.80	2.754	.104
Wire, silicon Br.....do.....	400	82.00	.19	.039
Staples.....do.....	400	13.00	.19	.006
Clips, 1-inch.....number.....	950	107.00	.451	.051
Clips, 7-inch.....do.....	900	57.40	.427	.027
Brush and poles.....cords.....	3,196	4,794.45	1.517	2.277
Rope, manilla.....pounds.....	5,200	942.00	2.409	.447
Miscellaneous expenses.....		175.30		.083
Subsistence.....		3,501.00		1.662
Steamboat expenses.....		1,090.50		.518
Labor.....		7,045.43		3.345
Supervision.....		525.00		.249
Total.....		20,942.33		9.944
Total field cost.....		20,942.33		

BALLASTING AND SINKING.

Mobilization and demobilization.....		\$65.00		\$0.031
Stone.....tons.....	1,309	2,371.00	0.617	1.126
Rope, manilla.....pounds.....	1,372	249.90	.651	.119
Miscellaneous expenses.....		58.16		.028
Subsistence.....		550.48		.261
Steamboat expenses.....		140.00		.066
Labor.....		1,090.40		.518
Supervision.....		85.00		.040
Total.....		4,609.94		2.189
Total field cost.....		4,609.94		

Paving (concrete, 791 squares; stone, 762 squares).*

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$270.00		\$0.174
Stone.....tons.....	1,430	2,610.03	0.921	1.681
Rope, manilla.....pounds.....	3,900	706.00	2.511	.454
Concrete.....cords.....	3,500	1,347.50	2.264	.868
Sand and gravel.....cubic yards.....	1,120	257.60	.721	.166
Coal.....tons.....	60	150.00	.039	.096
Oil.....		15.00		.010
Miscellaneous expenses.....		150.00		.096
Subsistence.....		2,285.00		1.471
Steamboat expenses.....		950.00		.612
Labor.....		4,960.00		3.194
Supervision.....		415.00		.267
Total.....		14,116.13		9.089
Total field cost.....		14,116.13		

Summary of costs (764 linear feet revetted).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot. ¹
	Per square.	Total.	Per square.	Total.		
Total field cost.....	\$12. 133	\$25,552. 27	\$9. 089	\$14, 116. 13	\$39,668. 40	\$39. 29
Surveys.....	. 127	267. 00	. 085	147. 51	414. 51	. 41
Care of plant.....	. 248	522. 16	. 186	288. 53	810. 69	. 80
Repair of plant.....	. 596	1,255. 03	. 446	693. 38	1,948. 41	1. 93
Depreciation of plant.....	. 723	1,522. 27	. 642	840. 90	2,363. 17	2. 34
Total.....	13. 827	29, 118. 73	10. 368	16, 086. 45	45, 205. 18	44. 77

¹ Includes the cost of completing mattresses and paving along 1,200 feet of last season's work.

Cost of completing last season's work.

Total field cost.....	\$9,650. 20
Surveys.....	100. 85
Care of plant.....	197. 24
Repair of plant.....	474. 48
Depreciation of plant.....	574. 60
Total.....	10,997. 37

Condition at the end of fiscal year.—About 80 per cent of the revetment required on the upper side of the neck is completed. The work is in excellent condition. Bank caving has definitely ceased throughout the length of bend where caving was most active. Caving, however, is in progress from the downstream end of the work for a distance of about 4,000 feet.

The levee, or dike, longitudinally of the neck, has effectively eliminated the question of cross flow, and consequent surface scour.

Local cooperation.—None.

Effect of improvement.—The heretofore caving bend has been stabilized. The point of the confronting reef has moved downstream correspondingly. In conjunction with the levee, or dike, constructed throughout the length of the neck, the threatened cut-off of the river across the latter has been obviated.

Proposed operations.—Extension, downstream, for a distance of about 4,000 feet will probably have to be made during the next two or three years unless the caving ceases or decreases materially in rate.

The necessity, or the contrary, for revetment on the lower side of the neck will depend wholly upon the further development of river conditions in the vicinity. Present indications point strongly to the probability that the main draw of the river will leave the caving bend, and that its revetment will therefore not be required.

(d) New Madrid, Mo.

Location.—Seventy-one miles below Cairo, right bank.

Original condition.—New Madrid is located at the head of a sharp bend of the river, opposite Watsons Point or Slough Landing Neck. The bank in front of the town had eroded for a number of years to the point that, in 1893, it was determined to be necessary to install revetment in order to fix the curvature of the river in this vicinity and to guard the town against its further inroads.

Previous projects.—None.

Existing project.—The existing project, dating from 1893, had in view the construction of a sufficient length of standard fascine revetment to stabilize river and bank conditions along the New Madrid front.

Operations and results prior to the fiscal year.—During the years 1893, 1894, 1896, 1898, and 1900 revetment was placed to the aggregate length of 4,450 feet, at a total cost of \$153,000.

The result has been a stable bank for the length given and throughout the balance of the downstream bend.

Operations and results during the fiscal year.—None.

Condition at the end of fiscal year.—The entire work is in excellent condition.

Local cooperation.—None.

Effect of improvement.—The curvature of the stream throughout the New Madrid Bend has been fixed, the front of the town made secure, and the destruction of its river-front property prevented.

Proposed operations.—None.

(c) Gayoso Bend, Mo.

Location.—One hundred and six miles below Cairo, right bank.

Original condition.—Caving in Gayoso Bend has been quite active for a number of years, and had progressed until the river bank was in such dangerous proximity to the controlling levee line that the United States constructed a levee loop around the most threatened point in 1914. This loop was extended downstream by the local levee board during 1915-16. A further retirement of the levee was deemed inadvisable on account of low and swampy country behind the existing levee, which would render levee construction unduly costly; hence, protection by revetment was authorized at the joint cost of the Federal Government and local levee district.

Precious projects.—None.

Existing project.—Adopted in 1916; contemplates the protection of the levee in this bend by the installation of standard fascine revetment.

Operations and results prior to the fiscal year.—None.

Operations and results during the fiscal year.—Operations consisted in the installation of 5,578 feet of standard fascine channel mattresses. Grading and paving along this stretch, however, have not been fully completed. The work was commenced on July 27, 1916, but was suspended on January 6, 1917, on account of high water; operations were resumed on May 2, and are still in progress.

The season's work was seriously handicapped throughout the season by the scarcity of brush and labor and unsuitable river stages during the latter part of the season.

The foregoing operations were accomplished by hired labor with Government plant at a total cost of \$210,500.

The following table gives details of cost:

GAYOSO BEND, MO. (106 E.) FIRST AND SECOND DISTRICTS.

Mattresses, total area, 14,820 square (channel mats, 98 per cent; connecting mats, 2 per cent).

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$264.00		\$0.017
1/2 inch strand..... pounds..	92,000	6,393.75	6.208	.431
1/2 inch strand..... do.....	33,500	1,832.75	2.260	.124
1/2 inch strand..... do.....	121,000	7,742.00	8.164	.522
Wire No. 9..... do.....	45,000	1,066.75	3.037	.114
Wire silicon Br..... do.....	2,900	594.50	.196	.040
Staples..... do.....	3,200	100.20	.216	.007
Clips 1/2 inch..... number..	6,060	677.60	.408	.046
Clips 1/2 inch..... do.....	6,100	389.00	.412	.026
Brush and poles..... cord..	19,291	30,573.84	1.302	2.063
Rope, manilla..... pounds..	10,465	1,901.20	.706	.128
Miscellaneous expenses.....		297.83		.020
Substance.....		19,990.49		1.349
Steamboat expenses.....		13,125.00		.886
Labor.....		27,988.11		1.899
Supervision.....		5,924.50		.400
Total.....		119,483.52		8.062
Total field cost.....		119,483.52		

BALLASTING AND SINKING.

Mobilization and demobilization.....		\$127.00		\$0.009
Stems..... tons..	10,176	20,355.05	0.687	1.373
Rope, manilla..... pounds..	4,186	760.48	.282	.061
Miscellaneous expenses.....		75.00		.005
Substance.....		2,240.30		.151
Steamboat expenses.....		1,260.20		.085
Labor.....		3,109.80		.210
Supervision.....		720.00		.049
Total.....		28,647.83		1.933
Total field cost.....		28,647.83		

3510 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Grading, 2,890 squares.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		\$63.50		\$0.022
Rope, manilla	pounds. 2,093	390.24	0.724	.132
Coal	tons. 357	892.77	.124	.310
Oil		47.16		.016
Miscellaneous expenses		299.74		.079
Subsistence		761.90		.263
Steamboat expenses		160.00		.065
Labor		1,969.50		.678
Supervision		225.90		.078
Total		4,719.81		1.633
Total field cost		4,719.81		

Paving (stones, 2,185 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		\$190.50		\$0.067
Stone	tons. 8,188	16,368.70	3.745	7.492
Rope, manilla	pounds. 4,186	790.48	1.916	.348
Miscellaneous expenses		125.00		.067
Subsistence		2,550.40		1.167
Steamboat expenses		2,550.50		1.167
Labor		5,100.80		2.335
Supervision		1,125.50		.515
Total		28,771.88		13.168
Total field cost		28,771.88		

Summary of costs (5,164 linear feet revetted).

	Subaqueous work.		Upper bank work.		Grand total. ¹
	Per square.	Total.	Per square.	Total.	
Total field cost	\$9.995	\$148,131.35	\$14.801	\$33,491.69	\$181,623.04
Office expenses .....	.144	2,124.50	.214	484.94	2,609.44
Surveys .....	.036	535.05	.064	122.11	657.16
Care of plant .....	.223	3,300.28	.332	753.17	4,053.45
Repair of plant .....	.535	7,931.85	.800	1,810.22	9,742.67
Depreciation of plant .....	.649	9,620.28	.970	2,196.55	11,816.83
Total	11.582	171,643.31	17.171	38,857.68	210,500.99

¹ Not completed on account of interruption by high water.

Condition at the end of fiscal year.—Caving continues upstream from the upper end of the revetment. The work should be extended upstream in order to fully protect the levee in this bend.

Local cooperation.—The St. Francis Levee Board of Missouri contributed \$150,000 toward the cost of this work.

Effect of improvement.—The revetment placed has resulted in stabilizing of the river bank and the protection of the levee.

Proposed operations.—Extension upstream for about 2,000 feet with the available balance. A further upstream extension of about 6,000 feet will probably be required.

(f) *Caruthersville, Mo.*

Location.—One hundred and ten miles below Cairo, right bank.

Original condition.—Prior to 1898 the river in this vicinity had approached the town of Caruthersville, to the point of requiring that the town front be revetted as the alternative to the serious destruction of its property and levee. It was desirable as well to hold this point as an assistance in fixing the banks, both above and below, where, for some distance, the controlling levee was quite close to the river.

Previous projects.—None.

Existing project.—The existing project provided for the holding of the Caruthersville point in the interest of channel and bank conditions in the locality, and dates from the year 1898. It contemplated the construction of a spur dike and sufficient fascine revetment to effect the purpose outlined.

Operations and results prior to the fiscal year.—From 1898 to 1903 one spur revetment dike and 2,400 feet of continuous fascine revetment were placed immediately in front of the town at a cost of \$72,173.91. Repairs since 1903 have cost \$2,072.25, making a total expenditure at Caruthersville of \$74,245.16.

The result of the work outlined has been the control of the confronting channel and of the river banks in the vicinity.

Operations and results during the fiscal year.—None.

Condition at the end of fiscal year.—The work is in excellent condition throughout.

Local cooperation.—None.

Effect of improvement.—The improvement has resulted in the prevention of further bank erosion, in the fixing of river conditions in the vicinity, and in guarding the town of Caruthersville and adjacent levees from serious destruction.

Proposed operations.—None.

(g) *Barfield, Ark.*

Location.—One hundred and forty-one miles below Cairo, right bank.

Original condition.—Caving has been very active from River Styx to Barfield Landing; at the latter point the controlling levee was breached. The topographical features of the country adjacent to the levee were such that to rebuild the levee on a location sufficiently remote from the caving bank to insure anything like a reasonable length of life, would be unduly expensive; therefore, protection by the installation of bank revetment was authorized with the understanding that the local levee board would construct a levee loop around the breach in the levee at Barfield Landing, Ark.

Previous projects.—None.

Existing project.—Adopted in 1916; contemplates the protection of the levee in this vicinity by the installation of standard revetment.

Operations and results prior to the fiscal year.—None.

Operations and results during the fiscal year.—Consisted in the installation of 3,475 feet of revetment. The work was commenced on September 18, 1916, but was suspended on account of high water on March 6, 1917. Operations were resumed on April 26, 1917, and are still in progress.

The season's work was seriously handicapped throughout the season by the scarcity of brush and labor and unfavorable river stages during the latter part of the season.

The foregoing operations were accomplished by hired labor with Government plant at a total cost of \$155,351.09.

The following table gives detailed costs:

BARFIELD, ARK. (141 R.), FIRST AND SECOND DISTRICTS.

Mattresses, total area, 10,627 squares (channel mats, 82 per cent; connecting mats, 18 per cent).

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total Cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$480.00		\$0.045
1/4-inch strand..... pounds..	56,300	3,912.75	5.298	.368
1/4-inch strand..... do.	23,000	1,269.00	2.164	.118
1/4-inch strand..... do.	71,000	4,548.00	6.680	.427
Wire No. 9..... do.	26,000	980.40	2.445	.082
Wire silicoon..... do.	1,600	328.00	.150	.031
Staples..... do.	2,400	75.80	.226	.007
Clips, 1/4-inch..... number..	8,750	411.00	.853	.039
Clips, 1/4-inch..... do.	3,600	229.50	.339	.022
Brush and poles..... cords..	15,829	96,777.83	1.461	2.520
Rope, manila..... pounds..	8,422	1,529.46	.792	.144
Miscellaneous expenses.....		1,488.99		.135
Subsistence.....		12,658.23		1.192
Steamboat expenses.....		11,981.87		1.128
Labor.....		18,965.96		1.787
Supervision.....		3,900.00		.367
Total.....		89,511.78		8.422
Total field cost.....		89,511.78		

BALLASTING AND SINKING.

Mobilization and demobilization.....		\$240.00		\$0.023
Stone..... tons..	8,190	16,388.90	0.770	1.542
Rope, manila..... pounds..	3,368	611.78	.317	.068
Miscellaneous expenses.....		359.75		.084
Subsistence.....		1,811.40		.170
Steamboat expenses.....		1,090.50		.102
Labor.....		2,494.06		.234
Supervision.....		550.00		.062
Totals.....		23,544.39		2.215
Total field cost.....		23,544.39		

Grading (2,960 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$120.00		\$0.040
Rope, manila..... pounds..	1,685	305.89	0.570	.103
Coal..... tons..	242	606.62	.082	.206
Oil.....		29.20		.010
Miscellaneous expenses.....		313.47		.106
Subsistence.....		621.00		.210
Steamboat expenses.....		175.00		.059
Labor.....		1,535.76		.519
Supervision.....		175.00		.069
Total.....		3,880.94		1.311
Total field cost.....		3,880.94		

Paving (concrete, 592 squares; stone, 893 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$960.00		\$0.242
Stone..... tons.....	1,849	3,700.08	1.245	2.492
Rope, manila..... pounds.....	3,369	611.78	2.270	.412
Cement..... sacks.....	3,410	1,619.60	2.296	1.091
Sand and gravel..... cubic yards.....	812	178.64	.547	.120
Coal..... tons.....	20	135.00	.020	.091
Oil.....		12.00		.008
Miscellaneous expenses.....		225.00		.151
Subsistence.....		2,150.00		1.448
Steamboat expenses.....		2,425.00		1.633
Labor.....		4,571.86		3.079
Supervision.....		375.00		.252
Total.....		16,363.96		11.019
Total field cost.....		16,363.96		

Summary of costs (3,475 linear feet revetted).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square.	Total.		
Total field cost.....	\$10.637	\$113,056.17	\$12.330	\$20,244.90	\$133,301.07	\$38.36
Office expenses.....	.179	1,894.69	.206	338.09	2,232.78	.64
Surveys.....	.028	299.20	.032	53.40	352.60	.10
Care of plant.....	.246	2,614.08	.284	466.55	3,080.63	.89
Repair of plant.....	.592	6,282.58	.663	1,121.40	7,403.98	2.13
Depreciation of plant.....	.717	7,620.03	.828	1,360.00	8,980.03	2.58
Total.....	12.399	131,766.76	14.368	23,584.34	155,351.09	44.70

Condition at the end of fiscal year.—Caving continues above, below, and in the gap between the revetment. The revetted bank has been stabilized.

Local cooperation.—None.

Effect of improvement.—The effect of the revetment placed has resulted in the prevention of further loss of levee where the river bank had receded to within 150 feet of the levee during the low-water period of 1916.

Proposed operations.—Placing of about 1,500 feet of revetment with the balance available, and an additional 10,000 feet as the necessary funds therefor become available.

(h) *Plum Point Reach, Ark. and Tenn.*

Location.—One hundred and forty-seven to one hundred and eighty-five miles below Cairo.

Original condition.—In accordance with the first plans of the commission, construction operations were limited to two reaches of the river where navigation difficulties were the most pronounced. The upper one, known as Plum Point Reach, covered the river from the head of Island 26, 147 miles below Cairo, to Randolph, Tenn., a distance of 38 miles. In this reach channel depths of 4½ to 6 feet were frequently reported. The early construction work was limited to the stretch between Ashport, Tenn., 153 miles below Cairo, and Bullerton towhead, a distance of 15 miles.

The width of the river between the high-water banks in this reach was largely in excess of the average, being 10,000 feet for much of its length, which resulted in shallow shifting channels.

Previous project.—To correct this condition works were inaugurated in 1881, providing for contraction of the low-water channel to a width of 3,000 feet,

this to be accomplished by means of permeable pile dikes, the closure of chutes behind towheads and islands, and the revetment of caving banks.

The development of hydraulic dredges and their success in maintaining temporary channels of ample depth during the low-water periods resulted, in 1895, in the suspension of channel contraction work, and since that date work has been confined to repairs to revetments.

Existing project.—Repairs to revetments.

Operations and results prior to the fiscal year.—Funds for construction work under the commission were first made available by the river and harbor act of March 3, 1881.

Under this project, revetment was placed in Ashport Bend (153 L.), Fletchers Bend (159 R.), Osceola Bar (162 R.), Bullerton towhead (168 R.); a total of about 5 miles. All of this early work consisted of woven mats, 100 to 140 feet in width, two-thirds of which failed owing to limited width and defective construction. The revetment along Bullerton towhead (9,650 feet in length) held the bank line until later covered by fascine mats 280 feet wide, which are still in place.

Permeable pile dikes were placed at Gold Dust (157 L.), to cut off flow through Elmot Chute; Osceola dikes (162 R.), to cut off the flow between Osceola Bar and the Arkansas bank; Bullerton dikes (167 R.), to close the channel behind Bullerton towhead; Plum Point dikes (167 L.), to contract the channel and concentrate the flow between Bullerton towhead and the Tennessee shore below Plum Point.

These dikes generally accomplished the purpose for which they were constructed.

From 1885 to 1888 lack of appropriations and restrictions imposed by law as to the character of work prevented necessary maintenance and extensions; and this, together with the flimsy character of construction incident to experimental work, resulted in general failure of the structures described. The work installed did, however, have a decided influence in channel depths throughout the reach.

The commission report of 1891 states:

"The least depth found in the improved part of the reach was 12 feet. The favorable results heretofore reported were maintained. The depth since the works were begun having doubled, the navigable capacity of this portion of the stream has been multiplied by 8."

In general terms it may be said that little difficulty has been experienced in navigating the reach since the contraction works approached completion.

Total expenditures to June 30, 1895, \$4,246,264.70.

Since 1895 there has been expended on repairs to the several revetments \$1,108,108.50.

Operations and results during the fiscal year.—During the year 2,960 linear feet of standard fascine channel mat has been installed in upstream extension of the last season's work and 4,300 linear feet of upper bank work along the last season's work. Operations commenced June 1, 1916, but were interrupted by high water from June 15 to July 12, 1916. Work was resumed on July 13 and continued until August 9, when the plant was moved to Wolf River, Tenn., to place foundation mattresses for the dam across that stream. The plant was moved back to Bullerton Bar, Ark., and operations resumed on September 1, 1916. Work was suspended again on account of high water from January 9 to 22, 1917. Work was resumed on January 23 and completed March 8, 1917.

The work described has been carried on by hired labor with Government plant, at a total expenditure of \$164,104.32.

The following table shows detailed costs:

BULLERTON BAR, ARK. (168 E.), FIRST AND SECOND DISTRICTS.

Mattresses, total area, 10,216 squares (channel mats, 72 per cent; connecting mats, 28 per cent).

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$180.00		\$0.018
1/2-inch strand..... pounds..	53,400	3,711.20	5.227	.363
1/2-inch strand..... do.....	26,069	1,428.00	2.555	.140
1/2-inch strand..... do.....	66,719	4,269.00	6.531	.418
Wire No. 9..... do.....	33,300	1,255.60	3.259	.123
Wire, silicon bronze..... do.....	1,500	307.50	.147	.030
Staples..... do.....	2,300	72.75	.235	.007
Clips, 1/2-inch..... number..	3,700	443.40	.387	.043
Clips, 1/2-inch..... do.....	3,700	236.00	.362	.023
Rope and poles..... cords..	13,683	23,090.35	1.360	2.260
Rope, manila..... pounds..	6,279	1,140.22	.615	.112
Miscellaneous expenses.....		447.76		.044
Subsistence.....		13,150.07		1.287
Steamboat expenses.....		7,929.48		.776
Labor.....		17,110.13		1.675
Supervision.....		2,649.00		.259
Total.....		77,420.46		7.578
Total field cost.....		77,420.46		

BALLASTING AND SINKING.

Mobilization and demobilization.....		\$90.00		\$0.009
Stone..... tons..	7,167	12,987.17	0.702	1.271
Rope, manila..... pounds..	2,812	456.09	.246	.045
Miscellaneous expenses.....		149.25		.015
Subsistence.....		1,910.20		.187
Steamboat expenses.....		990.00		.097
Labor.....		2,449.20		.239
Supervision.....		443.00		.043
Total.....		19,474.91		1.906
Total field cost.....		19,474.91		

Grading (2,799 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$45.00		\$0.016
Rope, manila..... pounds..	1,256	228.04	0.449	.081
Coal..... tons..	162	405.00	.058	.145
Oil.....		17.49		.006
Miscellaneous expenses.....		303.06		.108
Subsistence.....		437.50		.156
Steamboat expenses.....		125.00		.045
Labor.....		1,144.20		.409
Supervision.....		148.00		.053
Total.....		2,853.29		1.020
Total field cost.....		2,853.29		

Paving (stone, 4,250 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$135.00		\$0.032
Stone..... tons.....	11,735	21,350.70	2.761	5.024
Rope, manila..... pounds.....	2,511	456.09	.591	.107
Miscellaneous expenses.....		275.25		.065
Subsistence.....		4,150.75		.976
Steamboat expenses.....		3,250.00		.765
Labor.....		11,550.40		2.718
Supervision.....		1,620.00		.381
Total.....		42,788.19		10.069
Total field cost.....		42,788.19		

Summary of costs (2,960 linear feet revetted).

	Subaqueous work.		Upper bank work.		Grand total.	Total costs per linear foot. ¹
	Per square.	Total.	Per square.	Total.		
Total field cost.....	\$9.454	\$96,895.37	\$11.089	\$45,641.43	\$142,536.85	\$36.50
Office expenses.....	.022	224.16	.025	102.69	326.85	.08
Surveys.....	.050	515.46	.067	236.08	751.54	.19
Care of plant.....	.218	2,223.98	.248	1,018.78	3,242.76	.84
Repair of plant.....	.523	5,345.12	.594	2,448.54	7,793.66	2.02
Depreciation of plant.....	.632	6,451.45	.729	3,001.21	9,452.66	2.44
Total.....	10.929	111,655.54	12.742	52,448.78	164,104.32	42.07

¹ Includes the cost of completing connecting mattresses and paving along 4,300 feet of last season's work.*Cost of completing last season's work.*

Total field cost.....	\$34,455.10
Office expenses.....	76.81
Surveys.....	176.61
Care of plant.....	762.05
Repair of plant.....	1,831.50
Depreciation of plant.....	2,221.40
Total.....	39,553.47

Condition at the end of fiscal year.—The revetment works throughout Plum Point Reach are generally in effective condition, with the exception of that at the lower end of Ashport Bend, which was flanked some years since. During the present fiscal year there has been a further small loss at the lower end of the work by flanking, which, however, does not affect the effectiveness of the work as a whole.

High-water attack continues upstream from the upstream end of the new Bullerton Bar revetment and the old work at the downstream end, where a pocket cave developed during the last high water, resulting in the loss of about 700 feet of the old work.

The stone and brush dam at the head of chute of Island 30 has been destroyed, as heretofore reported, for a width of 1,300 feet near its center and flanked around its western end. The main draw of the river continues with additional loss through and around this dam and with enlargement of the chute of Island 30.

Local cooperation.—None.

Effect of improvement.—The channel throughout Plum Point Reach has been rendered more stable and its depth materially increased. Bank caving has been prevented throughout the length of the several revetments, and the Arkansas Levee from Fletchers Bend to near Bullerton has been thus protected, as have also the towns of Luxora and Osceola, Ark.

Proposed operations.—It will be necessary to extend the work upstream for about 4,000 feet and replace the 700 feet of old work destroyed during the last high water.

(i) *Golden Lake, Ark.*

Location.—One hundred and ninety-two miles below Cairo, right bank.

Original condition.—Caving had been in progress for many years prior to 1911. In the bend of Golden Lake the levee line had been located between the river and a large area of low, marshy ground to the rear. Its relocation would therefore have been both difficult and costly. The river had attained such proximity to the said levee line by 1911 as to require that the river channel be stabilized and further caving be prevented by the installation of revetment.

Previous projects.—None.

Existing project.—Adopted in 1911; had in view the prevention by bank revetment of further erosion in order that the channel might be held in definite position, the existing levee line maintained, and the construction of a costly levee loop around Golden Lake obviated.

Operations and results prior to the fiscal year.—During the years 1911 and 1912, 3,000 feet of standard fascine revetment were installed, at a total cost of \$101,492.98.

This work resulted in making essentially stable channel and bank conditions throughout Golden Lake bend, though somewhat active caving has been in progress for the past several years at the lower end thereof.

Operations and results during the fiscal year.—None.

Condition at the end of fiscal year.—The revetment is in good condition, with the exception that a pocket cave has set up at its lower end, with some loss of upper bank paving. This condition is of relatively small consequence for the present, and no evidence exists that it will require any attention for several years.

Local cooperation.—None.

Effect of improvement.—Bank caving throughout the length and in the vicinity of the revetment has been stopped and the existing levee line maintained, thereby avoiding the necessity and expense of a costly levee loop around Golden Lake. The channel has been held to position throughout the bend.

Proposed operations.—None.

(j) *Hopefield Bend, Ark.*

Location.—Two hundred and twenty-seven miles below Cairo, right bank.

Original condition.—The old course of the river in this locality crossed from the Tennessee shore above Memphis in a long sweep to the Arkansas shore, thence by an acute bend back to the Tennessee shore in the vicinity of Memphis. This situation involved persistent and finally very active caving from about Mound City, Ark., downstream to Hopefield Point. It became evident about 1880 that continued loss of bank throughout the stretch of river in question would seriously damage, if not destroy, the important harbor of Memphis.

Previous projects.—None.

Existing project.—Adopted in 1882; contemplated the revetment of the bend between Hopefield and Mound City to the extent necessary to hold the river in its then course and to thus maintain the harbor of Memphis.

Operations and results prior to the fiscal year.—Beginning in the year 1882 a total of 16,600 feet of woven willow revetment was placed, to and including the year 1889, at a total cost of \$836,000. The river and harbor act of 1886 prohibited "works of bank protection or revetment." This restriction prevented the extension of the work as contemplated and resulted in the loss of nearly a mile of revetment and a recession of Hopefield Point, amounting to over 3,000 feet before renewal of the work was authorized. The woven willow mattress proved ineffective and was replaced between the years 1893 and 1906, with standard fascine revetment construction to the extent of 14,800 linear feet, at the additional total cost of \$497,481.78. From 1906 to 1912 maintenance expenditure was required to the amount of \$183,998.79. The work described was fully effective until the high water of 1912, when the main river broke through between Hen and Chicken Islands, impinging directly upon the downstream end of the Hopefield work, with the result that the latter was flanked and about 700 feet lost; this loss was replaced in 1912 and extensive repairs otherwise made at a cost of \$61,616.60.

Again in the flood of 1913 the lower end of the work was similarly flanked, with the development of a large pocket cave incident to a powerful eddy—per-

haps the most extensive known in this vicinity—the location and effect of which was such as to require that the bank within the pocket and throughout the radius of activity of the eddy referred to be further protected. This was accomplished in 1913 by the installation of 2,307 feet of channel mattress, a number of connecting mattresses, upper bank paving, etc., at a total cost of \$125,179.86. Throughout the high waters since the flood of 1913 the entire Hopefield revetment has remained undisturbed and is therefore fully effective. Although the eddy described obtains in every river approaching a bank full stage, no further tendency to flank the downstream end of the work is apparent.

The total expenditure at Hopefield Bend prior to the fiscal year, therefore, amounts to \$1,704,277.03.

Operations and results during the fiscal year.—To prevent further enlargement of a large hole back of the revetment at Hopefield Point, which was made during the 1913 high water, an earthen dike 500 feet long was constructed between the hole and river bank. The slopes and crown of this dike were paved with concrete 6 inches thick and a cut-off wall of concrete 5 feet deep and 1 foot thick was placed on the upstream side. The dike served its purpose admirably, although both ends were slightly damaged and should be repaired before another high water.

The foregoing work was accomplished by written formal agreement with Roach & Stansell at a total cost of \$7,296.03. The United States furnished the cement, sand, and gravel.

Condition at the end of fiscal year.—The revetment generally throughout this bend is in excellent condition. There is, however, a small pocket cave about 1,500 feet above Hopefield Point which should be repaired during next season. Some pocket caves occurred during the last high water below the lower end of the revetment, which, however, resulted in no damage to the work and are not of sufficient importance to warrant immediate attention.

Local cooperation.—None.

Effect of improvement.—The bank and channel throughout Hopefield bend were fixed from the installation of the Hopefield work until 1912 when, as observed above, the river changed its course, breaking through between Hen and Chicken Islands. Any tendency or possibility of cut-off of the river by way of Hopefield Lake has been obviated and the harbor of the city of Memphis maintained.

Proposed operations.—Repairs to the earth dike and to the small pocket cave 1,500 feet above Hopefield Point are contemplated.

(k) Memphis Harbor, Tenn.

Location.—Two hundred and thirty to two hundred and thirty-two miles below Cairo, left bank.

Original condition.—The city of Memphis differs from most of the Mississippi River towns to the extent that it is not located on delta ground, but upon what have been known as the Chickasaw Bluffs. These bluffs being reasonably stable, the river-front property of the town was constructed fairly close to the river bank. In the course of time, however, and during the early seventies bank erosion set up and progressed to the point of endangering the town and its valuable river-front improvements, so that it became necessary to consider the installation of protective works such that the city would be guarded against property loss, its harbor maintained, and its river commerce assured.

Previous projects.—None.

Existing project.—The existing project, adopted in 1878, contemplated the protection of the Memphis harbor front from further bank loss by the installation of spur dikes and woven-willow revetment.

Operations and results prior to the fiscal year.—Between the years 1878 and 1898 8 spur dikes and 14,800 linear feet of woven-willow revetment were installed from somewhat beyond the old mouth of Wolf River, south to near the present Frisco Bridge.

The cost of the work described was borne in part by the United States and in part by local interests. Out of a total expenditure of \$551,472.76 the United States provided \$508,000 and local interests \$43,472.76.

The work has been successful, having fully effected its purpose. Since 1898 no maintenance or other expenditure has been required.

Operations and results during the fiscal year.—Operations during the present year consist in the completion of the excavation of the diversion canal to divert the flow of Wolf River along the Memphis front, the dredging of a

channel between the Tennessee shore and the sand bar in front of the said harbor, and the construction of a dam across Wolf River to force the flow of that stream through the diversion canal, thence along the paved wharf with a view of maintaining a channel of sufficient depth during low-water season to serve water-borne traffic, and dredging a channel through a sand bar in the Mississippi River at the entrance of the Loosahatchee River to maintain a flow of water from the Mississippi River through the latter stream.

The foregoing work was under the direction of the secretary, Mississippi River Commission, until November 30, 1916, and thereafter under the direction of the district engineer officer, first and second Mississippi River districts. At the time the work was taken over by this office there were two dredges at work, a pipe-line hydraulic dredge and a dipper dredge, and some shore-protection work at the dam across Wolf River was in progress. The latter work was completed on December 15, 1916, and dredging operations were suspended due to a rise in the river on December 12, 1916. Upon the recession of high water dredging operations in Memphis Harbor were resumed with one pipe-line hydraulic dredge on May 2, 1917, and on May 22 another pipe-line hydraulic dredge commenced operations cutting a channel through a sand bar in the Mississippi River at the entrance of the Loosahatchee River with a view of maintaining a flow of water from the Mississippi River through the latter stream, and to afford facilities for serving various manufacturing interests located on Wolf River. On May 24 hydraulic grader No. 1205 was put to work washing the deposit of mud and silt off the paved wharf.

These operations were still in progress on May 31, 1917.

The foregoing work was accomplished with hired labor, using Government plant, at a total cost since December 1, 1916, of \$20,547.97. The sum expended under the direction of the secretary, Mississippi River Commission up to November 30, 1916, amounted to \$90,381.90, making a total cost up to May 31, 1917, of \$110,937.87.

Condition at the end of fiscal year.—The condition of all bank-protection work in the Memphis Harbor is excellent. The depth and width of the channel along the paved wharf is ample to take care of all river-borne traffic, but dredges will have to be used to maintain it.

Local cooperation.—The town of Memphis contributed to the bank protection work above described, \$43,472.76.

Effect of improvement.—The town of Memphis has been relieved of the danger of property loss, and its harbor maintained. The restrictions of the city's wharfage and river conveniences which existed at the end of the last fiscal year have been corrected by the Wolf River diversion canal and dredging along the paved wharf. In order to maintain the Memphis Harbor dredging will probably have to be resorted to every low-water season.

Proposed operations.—It is proposed to continue dredging operations during the coming low-water season in the channel along the Memphis front and through the bar at the entrance of the Loosahatchee River and to increase the height of the Wolf River Dam.

(I) *Star Landing, Miss.*

Location.—Two hundred and fifty-seven miles below Cairo, left bank.

Original condition.—Caving in Star Landing Bend had been persistently active for a number of years, to the extent that the adjacent levees were several times breached, necessitating the construction of some four levee loops. In 1912 and 1913 the rate of caving was such as to again seriously threaten the levee system, to guard against which revetment protection was authorized at the combined cost of the Federal Government and the local levee district.

Previous projects.—None.

Existing project.—Adopted in 1914; contemplates the construction of about 10,000 linear feet of standard fascine revetment, located in the most advantageous relation to the levee system.

Operations and results prior to the fiscal year.—The work accomplished prior to the present year consisted in the protection by standard willow fascine revetment of 10,635 linear feet of bank, at a cost of \$365,161.29 for new work and \$785.65 for repairs.

Operations and results during the fiscal year.—Operations during the present year consisted in repairs by the installation of 1,148 squares of connecting mattresses in several pocket caves in the existing work, 1,820 squares of grading, and 1,022 squares of paving along the upper bank in the caves referred to. Work was commenced on November 9, 1916, but had to be suspended on account

of high water on January 10, 1917. Operations were resumed on February 8, but had to be suspended again on account of high water on February 27, 1917.

During the rise of the river in January and February, 1917, quite extensive breaks in the revetment occurred which destroyed about 8,000 feet of revetment. The destroyed work should be replaced during the coming season.

The repair work referred to above was accomplished by hired labor with Government plant, at a cost of \$87,670.61.

The following table gives detailed cost:

STAR LANDING, MISS. (257 L.), FIRST AND SECOND DISTRICTS.

Mattresses, total area, 1,148 squares (connecting mats, 100 per cent).

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		\$385.00		\$0.335
1/4-inch strand.....pounds..	3,000	208.50	2.613	.182
1/4-inch strand.....do.....	4,500	246.25	3.920	.214
1/4-inch strand.....do.....	6,500	415.50	5.602	.302
Wire No. 9.....do.....	4,400	166.00	3.833	.145
Staples.....do.....	300	9.50	.261	.008
Clips, 1/4-inch.....number..	200	23.00	.174	.020
Clips, 1/4-inch.....do.....	600	38.40	.523	.033
Brush and poles.....cord.....	1,650	2,887.10	1.437	2.515
Rope, manila.....pounds..	1,000	184.00	.871	.100
Miscellaneous expenses.....		130.00		.113
Subsistence.....		1,738.41		1.514
Steamboat expenses.....		2,983.91		2.599
Labor.....		4,037.00		3.517
Supervision.....		589.50		.514
Total.....		14,042.07		12.231
Total field cost.....		14,042.07		

BALLASTING AND SINKING.

Mobilization and demobilization		\$185.00		\$0.161
Stone.....tons.....	865	1,418.60	.753	1.236
Rope, manila.....pounds..	400	73.60	.348	.064
Miscellaneous expenses.....		70.00		.061
Subsistence.....		886.40		.772
Steamboat expenses.....		1,491.95		1.300
Labor.....		2,018.45		1.758
Supervision.....		296.00		.267
Total.....		6,439.00		5.609
Total field cost.....		6,439.00		

Grading (1,820 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		\$95.00		\$0.052
Rope, manila.....pounds..	200	36.80	0.110	.020
Coal.....tons.....	97	279.80	.050	.154
Oil.....		18.00		.010
Miscellaneous expenses.....		175.00		.098
Subsistence.....		232.80		.128
Steamboat expenses.....		525.00		.288
Labor.....		534.85		.294
Supervision.....		75.00		.041
Total.....		1,972.25		1.083
Total field cost.....		1,972.25		

Paving (concrete, 646 squares; stone, 376 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$285.00		\$0.279
Stone.....tons..	1,052	1,734.86	1.029	1.697
Rope, manilla.....lbs..	400	73.60	.391	.072
Cement.....sacks..	2,360	861.40	2.309	.842
Sand and gravel.....cubic yards..	732	366.00	.716	.358
Coal.....tons..	23	76.41	.022	.075
Oil.....		5.00		.005
Miscellaneous expenses.....		73.48		.072
Subsistence.....		1,278.80		1.251
Steamboat expenses.....		2,225.40		2.178
Labor.....		3,510.20		3.435
Supervision.....		480.50		.470
Total.....		10,970.65		10.734
Total field cost.....		10,970.65		

Summary of costs (linear feet revetted).

	Subaqueous work.		Upper bank work.		Grand total. ¹
	Per square.	Total.	Per square.	Total.	
Total field cost.....	\$17.840	\$20,481.07	\$11.817	\$12,942.90	\$33,423.97
Surveys.....	.079	91.23	.053	57.60	148.83
Care of plant.....	.346	397.55	.230	251.00	648.55
Repair of plant.....	.833	955.77	.561	602.96	1,558.73
Depreciation of plant.....	1.009	1,158.90	.669	731.63	1,890.53
Total.....	20.107	23,084.52	13.320	14,586.09	37,670.61

¹ All repair work, hence the cost per linear foot of bank protected can not be given.

Condition at the end of fiscal year.—All revetment except about 3,000 feet destroyed is in excellent condition. With the renewal of the destroyed work, complete protection will be afforded to the levees throughout this reach. There has been no recurrence of the surface scour behind the upper bank work mentioned in the last annual report.

Local cooperation.—The Yazoo-Mississippi Delta Levee Board contributed to the cost of the work in place the sum of \$210,000.

Effect of improvement.—Notwithstanding the destruction of about 3,000 feet of revetment, the integrity of the levees has been maintained. Abnormal currents developed in the river during the past high water, which attacked and destroyed the work referred to above. The channel appears to be in a state of transition, due no doubt to changes in the bend above.

Proposed operations.—The replacement of the destroyed work.

(m) Porter Lake, Ark.

Location.—Two hundred and sixty-one miles below Cairo, right bank.

Original condition.—Prior to 1910 more or less intermittent caving had taken place in the vicinity of Porter Lake, though dangerous proximity to the Arkansas levee had not developed until about the year named. The importance of maintaining the existing levee line centers in the fact that a number of lakes are found in such relation thereto that a levee loop, which of necessity would have to be located behind the said lakes, would in consequence have been very extensive and costly. The alternative was, therefore, the construction of revetment, to the end of holding the channel to position and of maintaining the existing levee line.

Previous projects.—None.

Existing project.—Authorized in 1911; contemplated the construction of standard fascine revetment to prevent further bank caving.

Operations and results prior to the fiscal year.—The operations at Porter Lake prior to the present year consisted in the installation of 8,640 feet of standard revetment during the years 1911, 1912, and 1913. The work has been efficient, holding the bank and obviating the necessity for the construction of a costly levee loop; \$381,454.03 has been expended for construction and \$18,410.21 for maintenance, a total of \$399,864.24.

Operations and results during the fiscal year.—A revetment plant was placed at this point on March 10, 1917, but on account of the high stage of the river active mat construction was not commenced until May 15. Preliminary work, however, such as clearing the bank and digging deadman holes, commenced May 7. At the end of the season work was still in progress, 582 feet of channel mattress No. 1 having been constructed.

The foregoing work was done by hired labor with Government plant, at a total cost of \$25,932.87, which includes the cost of certain materials for the further prosecution of the work.

Inasmuch as no work was completed, no table of costs is given.

Condition at the end of fiscal year.—The upper 5,200 feet of the work is in effective condition. The lower 3,400 feet, however, has been destroyed, and work of replacing same is in progress. In addition to the loss of work referred to, caving has progressed downstream for a distance of about 5,000 feet below the original downstream end of the revetment. The bank along this reach had been perfectly stable for a number of years. During the past high water, however, active caving began in the vicinity of Fritz Landing and is still more or less active, and will necessitate the extension downstream of this revetment for a distance of about 5,000 feet below the original work.

Local cooperation.—None.

Effect of improvement.—The revetment described has fixed the channel and has maintained a stable bank throughout the upper part of the Porter Lake bend. The adjacent levee has been protected. For continued similar results the portion of the lower work destroyed must be replaced and work extended downstream to cover the recently actively caving bank.

Proposed operations.—It is proposed to replace some 3,400 feet of lost revetment at the downstream end of the bend and extend the work still farther downstream for a distance of about 5,000 feet.

(n) Walnut Bend, Ark.

Location.—Two hundred and eighty-one miles below Cairo, right bank.

Original condition.—Bank caving throughout Walnut Bend finally brought the Mississippi River into such relation to the St. Francis River as to suggest the danger of cutoff between the two. Moreover, the river bank had approached the Arkansas Levee to the point that the latter was in imminent hazard of being breached, a condition that would have required the construction of an expensive levee loop. The combined situations therefore finally led, in 1907, to the necessity that Walnut Bend be protected by revetment.

Previous projects.—None.

Existing project.—The existing project, initiated in 1907, provided for the installation of about 7,000 feet of standard fascine revetment, placed with relation to the adjacent levee, and with due regard to the possibility of cutoff between the Mississippi and St. Francis Rivers.

Operations and results prior to the fiscal year.—During the years 1907, 1908, 1909, 1910, and 1911 7,160 feet of revetment was placed at a total cost of \$413,870.16, of which \$374,149.96 applies to new construction and \$39,720.20 to repairs.

As a result of the work described the revetted bank has since remained stable.

Operations and results during the fiscal year.—None.

Condition at the end of fiscal year.—The entire length of revetment is in excellent condition. A resumption of active caving at the lower end of the bend is observed, though the existing revetment is not affected thereby. For several years past a deepening is noted at the outer edge of the downstream end of the work, though its extent is not sufficient to suggest any serious instability of the construction.

Local cooperation.—None.

Effect of improvement.—Walnut Bend has been made stable throughout the length of its revetment; the adjacent levee has been safeguarded from destruction, and whatever danger of cutoff between the Mississippi and St. Francis Rivers may have existed has been eliminated.

Proposed operations.—None.

(o) *Trotters, Miss.*

Location.—Three hundred and four miles below Cairo, left bank.

Original condition.—For many years bank caving throughout Trotters bend was persistent, with the result that the river in 1912 had attained hazardous proximity to the Mississippi Levee near the lower end of the bend. The estimated cost of a levee loop was such that the alternative of bank revetment was concluded upon.

Previous projects.—None.

Existing project.—Adopted in 1912; provides for controlling this bend and protecting the adjacent levee by the installation of continuous bank revetment.

Operations and results prior to the fiscal year.—The construction in question was accomplished during the years 1912 and 1913 to the extent of 6,625 feet, at a total cost of \$271,953.70 for new work and \$2,949.56 for repairs. The work has resulted in fixing channel and bank conditions throughout the length of the work.

Operations and results during the fiscal year.—None.

Condition at the end of fiscal year.—The entire revetment is in excellent condition. Some minor repairs to upper-bank paving remain to be done. Such will be undertaken when suitably low-river stages obtain.

Caving continues throughout the upper part of the bend, and will probably require during the next couple of seasons upstream extension of the work in place.

Local cooperation.—The Yazoo-Mississippi Delta Levee Board contributed \$100,000 to the cost of the Trotters revetment.

Effect of improvement.—The lower end of the bend has been made stable, the confronting channel fixed, and the adjacent Mississippi River levee maintained, thus eliminating the alternative necessity for the construction of a costly levee loop.

Proposed operations.—None at present. It is probable that upstream extension of the existing work may be required within the next few years.

(p) *Helena, Ark.*

Location.—Three hundred and six miles below Cairo, right bank.

Original condition.—The river bank in the vicinity of Helena during the eighties showed intermittent sloughs or settlements in the nature rather of vertical sinks than of the ordinary bank caving. The difference was recognized, as is evident from the statement regarding the low ground immediately behind the Helena Levee, which in 1888 was referred to as "a swamp * * *," which seems to have been the most prolific cause of caving for some years past." To minimize the supposed effects of this swamp it was proposed that this low ground should be drained by way of a canal to the south. By 1888 the settlements or sinks referred to had caused bank recession to the point of jeopardizing the property and industries of the town. These sinks or subsidences, of greater or less extent, continued to occur at irregular intervals till in 1913 the most extensive of all appeared.

Previous projects.—None.

Existing project.—The existing project was adopted in 1888 and contemplates the construction of fascine revetment and spur dikes along the Helena front to the extent necessary to make stable bank conditions in that locality.

In addition, by a special item in the river and harbor act of March 4, 1913, \$100,000 was provided "to prevent a breach in the Helena front levee by revetment or otherwise."

Operations and results prior to the fiscal year.—Between the years 1889 and 1898, inclusive, 7 revetment dikes and 5,000 linear feet of standard fascine revetment were installed along the Helena front, at a total cost of \$199,000. Repairs and maintenance since 1898 have cost \$40,018.81, making an aggregate of \$239,018.81.

In addition to the revetment costs, 47 borings, aggregating 3,597 feet in length, were taken in 1913, 1914, and 1916, at a cost of \$8,084.77, to the end of determining the underlying causes of instability along the Helena foreshore.

In 1914, 99,605 cubic yards of stable hill earth were deposited over the area of subsidence at a cost of \$44,949.19.

The borings above referred to clearly established the existence of a number of layers of very unstable and, in some cases, quick material underlying the Helena vicinity, at a depth below the natural surface of some 40 to 60 feet. In cases these layers of unstable material had total thicknesses of 50 feet and rested throughout on an underlying strata of hard, impervious, brown clay, found at maximum depths of about 95 feet. The uppermost layers of the unstable material in consideration are found at about the zero of the Helena gage.

Operations and results during the fiscal year.—At the direction of the Mississippi River Commission investigation of the Helena situation by borings was continued. During the low-water period of 1916 five additional borings were secured in the river. The said borings disclosed results similar to those previously made.

The foregoing work was accomplished by hired labor with Government plant at a total cost of \$1,150.33.

All revetment work is in excellent condition.

Condition at the end of fiscal year.—During the past low-water season the foreshore has shown no evidence of instability. It is practically certain, however, that in a long period of low water further subsidences will occur to the northward of the area already affected.

Local cooperation.—None.

Effect of improvement.—The revetment work along the Helena front has protected the town and its industries to the south from encroachment by the river. It has not, however, provided against subsidence of the foreshore, the instability of which has reappeared at irregular intervals.

The deposit of stable hill earth over the disturbed area is shown by borings to have forced out practically all underlying unstable material for a short distance, which suggests that continued though indefinite fill, following further evidence of instability, may be expected to restore conditions of essential equilibrium.

Proposed operations.—None.

(q) Delta, Miss.

Location.—Three hundred and fifteen miles below Cairo, left bank.

Original condition.—Caving at this point, which had been active for a number of years, developed in 1914 a condition of such menace to the controlling levee, located between the river bank and the foot of Moon Lake, as to require the revetment of the Delta Bend. The destruction of the levee would have necessitated the construction of a long and expensive loop around the said lake. To guard against such a contingency revetment protection was authorized at the combined cost of the Federal Government and local levee district.

Previous projects.—None.

Existing project.—The existing project, adopted in 1915, contemplated the installation of about 9,000 feet of standard fascine revetment located in required relation to the levee system.

Operations and results prior to the fiscal year.—Operations prior to the fiscal year consisted in the installation of 5,030 feet of fascine mattresses and 2,950 squares of upper-bank paving, at a cost of \$209,702.53. The project was not completed on account of very unfavorable river stages which prevailed almost throughout the entire working season.

Operations and results during the fiscal year.—Operations on the project were continued until June 12, 1916, when they had to be suspended on account of the high stage of the river. Operations were resumed again on July 11 and prosecuted continuously until completion of the work on December 11, 1916. During the season 2,165 linear feet of channel mattresses, 1,462 squares of connecting mattresses, and 3,490 squares of paving were installed. Part of the connecting mattresses and paving placed was along the last season's work to complete the same.

The foregoing work was accomplished by hired labor with Government plant at a total cost of \$122,775.59.

The following table gives detailed cost:

DELTA, MISS. (315 L.), FIRST AND SECOND DISTRICTS.

Mattresses, total area, 6,908 squares (channel mats, 79 per cent; connecting, mats, 21 per cent).

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		\$146.20		\$0.021
1/2-inch strand.....pounds..	45,500	3,162.20	6.574	.458
1/2-inch strand.....do.....	11,500	628.25	1.665	.091
1/2-inch strand.....do.....	47,200	3,020.00	6.833	.437
Wire, No. 9.....do.....	21,300	803.25	3.083	.116
Wire Silicon Br.....do.....	1,600	325.00	.232	.047
Staples.....do.....	1,200	35.00	.174	.005
Clips, 1/2-inch.....number..	3,000	337.00	.434	.041
Clips, 1/2-inch.....do.....	3,000	191.30	.434	.030
Brush and poles.....cords..	9,485	14,227.05	1.373	2.060
Rope, manila.....pounds..	6,279	1,140.22	.909	.165
Miscellaneous expenses.....		1,107.31		.160
Subsistence.....		12,071.85		1.747
Steamboat expenses.....		5,307.48		.768
Labor.....		17,462.20		2.528
Supervision.....		2,688.25		.389
Total.....		62,658.56		9.071
Total field cost.....		62,658.56		

BALLASTING AND SINKING.

Mobilization and demobilization		\$72.60		\$0.011
Stone.....tons.....	4,378	7,220.46	0.634	1.045
Rope, manila.....pounds..	2,512	456.09	.364	.066
Miscellaneous expenses.....		276.80		.040
Subsistence.....		1,810.00		.262
Steamboat expenses.....		710.40		.103
Labor.....		2,532.40		.366
Supervision.....		336.75		.049
Total.....		13,415.50		1.942
Total field cost.....		13,415.50		

Grading (2,640 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization		\$36.30		\$0.014
Rope, manila.....pounds..	1,256	228.04	0.476	0.066
Oil.....tons.....	385	1,047.36	.146	.397
Oil.....		61.41		.023
Miscellaneous expenses.....		436.87		.165
Subsistence.....		1,008.71		.382
Steamboat expenses.....		250.00		.095
Labor.....		2,398.83		.909
Supervision.....		225.00		.085
Total.....		5,693.52		2.156
Total field cost.....		5,693.52		

Paving (concrete, 2,780 squares; stone, 710 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$108.90		\$0.031
Stone..... tons.....	2,037	3,340.68	0.583	.967
Rope, manila..... pounds.....	2,511	456.09	.719	.131
Cement..... sacks.....	11,364	4,560.48	3.256	1.307
Sand and gravel..... cubic yards.....	3,135	2,351.49	.803	.674
Coal..... tons.....	40	119.20	.012	.034
Oil.....		17.40		.005
Miscellaneous expenses.....		250.00		.072
Subsistence.....		2,038.40		.738
Steamboat expenses.....		4,135.00		1.151
Labor.....		4,596.32		1.317
Supervision.....		1,750.00		.502
Total.....		24,300.96		6.963
Total field cost.....		24,300.96		

Summary of costs (2,165 linear feet revetted).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot. ¹
	Per square.	Total.	Per square.	Total.		
Total field cost.....	11.013	\$76,074.06	9.119	\$39,994.48	\$106,068.54	39.86
Office expenses.....	.006	36.35	.004	14.33	50.68	.02
Surveys.....	.028	190.04	.023	75.06	265.10	.10
Care of plant.....	.269	1,890.69	.223	733.52	2,594.21	1.00
Repair of plant.....	.647	4,471.98	.536	1,762.95	6,234.93	2.84
Depreciation of plant.....	.795	5,423.95	.651	2,138.18	7,562.13	2.84
Total.....	12.747	88,067.07	10.556	34,718.52	122,775.59	46.16

¹ Includes the cost of completing connecting mattresses and paving along last season's work.

Cost of completing last season's work.

Total field cost.....	\$19,768.30
Office expenses.....	9.45
Surveys.....	49.44
Care of plant.....	438.82
Repair of plant.....	1,162.81
Depreciation of plant.....	1,410.34
Total.....	22,839.16

Condition at the end of fiscal year.—Caving has entirely ceased throughout the portion of the bend revetted and the integrity of the controlling levee line is assured. The extension of the work downstream may be required at some future date.

Local cooperation.—The Yazoo-Mississippi Levee Board contributed \$160,000 to the cost of the work.

Effect of improvement.—The channel in Delta Bend has been fixed throughout the stretch revetted, further bank caving prevented, and the necessity for the construction of a costly levee loop around Moon Lake obviated.

Proposed operations.—Minor repairs to the upper bank pavement will be made during the coming season

(r) Oldtown, Ark.

Location.—Three hundred and twenty-four miles below Cairo, right bank.

Original condition.—Continued caving over a number of years prior to 1907 finally required, in that year, revetment of Oldtown Bend or the construction of a levee loop, the river bank having receded almost to the toe of the existing levee.

Previous projects.—None.

Existing project.—The existing project was adopted in 1907 and contemplated the installation of sufficient revetment to fix the channel and bank line throughout the bend and thus to protect the adjacent Arkansas levee.

Operations and results prior to the fiscal year.—Beginning in 1907, to and including 1913, about 8,455 feet of standard fascine revetment and about 500 feet of sawed lumber revetment were installed at a cost of \$456,342.84.

The result was the stabilization of the Arkansas bank of the river for the length named and for some distance below.

Operations and results during the fiscal year.—Operations were commenced on December 12, 1916, but suspended on account of high water on January 12, 1917. Operations were resumed on January 19, but interrupted on March 5, resumed again on May 2, and are still in progress at the end of the season. During the season 6,945 squares of subaqueous work was placed.

The foregoing work was accomplished by hired labor with Government plant, at a total cost of \$87,570.64.

The following table gives detailed cost:

OLD TOWN BEND (324 R.), FIRST AND SECOND DISTRICTS.

Mattresses, total area, 6,945 squares (channel mats, 60 per cent; connecting mats, 40 per cent).

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$206.70		\$0.030
1-inch strand..... pounds..	35,324	2,455.00	5.086	.353
1-inch strand..... do.....	16,000	875.50	2.304	.126
1-inch strand..... do.....	40,000	2,559.00	5.780	.368
Wire No. 9..... do.....	23,185	874.26	3.338	.126
Wire silicon Br..... do.....	1,200	246.00	.173	.085
Supplies..... do.....	1,000	31.75	.144	.005
Caps, 3 inch..... number..	2,100	236.20	.302	.034
Caps, 1 1/2 inch..... do.....	2,000	127.80	.288	.018
Brush and poles..... cords..	9,645	17,330.18	1.390	2.495
Rope, manilla..... pounds..	5,023	911.98	.723	.131
Miscellaneous expenses.....		607.92		.088
Subistence.....		8,477.54		1.221
Steamboat expenses.....		8,215.29		1.183
Labor.....		13,328.28		1.919
Supervision.....		2,145.00		.309
Total.....		58,628.09		8.441
Total field cost.....		58,628.09		

BALLASTING AND SINKING.

Mobilization and demobilization.....		\$103.30		\$0.015
Stone..... tons..	4,292	7,060.34	0.618	1.016
Rope, manilla..... pounds..	2,512	455.99	.362	.066
Miscellaneous expenses.....		144.60		.021
Subistence.....		2,166.38		.312
Steamboat expenses.....		1,643.10		.236
Labor.....		2,065.00		.384
Supervision.....		430.00		.062
Total.....		14,668.71		2.112
Total field cost.....		14,668.71		

Grading (35½ squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$53.00		\$0.150
Rope, manilla.....pounds.....	837	151.99	2.364	.429
Coal.....tons.....	53	158.40	.180	.447
Oil.....		19.37		.055
Miscellaneous expenses.....		151.22		.427
Subsistence.....		188.00		.531
Steamboat expenses.....		110.00		.311
Labor.....		420.00		1.186
Supervision.....		125.00		.353
Total.....		1,376.98		3.890
Total field cost.....		1,376.98		

Summary of costs (linear feet retted).

	Subaqueous work.		Upper bank work.		Grand total. ¹
	Per square.	Total.	Per square.	Total.	
Total field cost.....	\$10.553	\$73,296.80	\$3.889	\$1,376.98	\$74,673.78
Office expenses.....	.211	1,463.72	.078	27.47	1,491.19
Surveys.....	.019	134.14	.007	2.53	136.67
Care of plant.....	.253	1,750.51	.093	33.01	1,783.52
Repair of plant.....	.605	4,207.16	.224	79.35	4,286.51
Depreciation of plant.....	.734	5,102.73	.272	96.24	5,198.97
Total.....	12.375	85,955.06	4.563	1,615.58	87,570.64

¹ Not completed on account of interruption by high water.

Condition at the end of fiscal year.—The upper 6,000 feet of revetment is in effective condition. However, the lower 3,000 feet has been practically destroyed by the last two high waters, the renewal of which was in progress at the end of the season's work.

Local cooperation.—None.

Effect of improvement.—The Arkansas Levee, adjacent to the upper end of Oldtown Bend, has been protected, and the necessity for a costly substitute has been avoided.

Proposed operations.—The renewal of the portion of the work destroyed, which is now in progress and will be continued.

(s) Sunflower, Miss.

Location.—Three hundred and fifty-five miles below Cairo, left bank.

Original condition.—Caving in Sunflower Bend, active for a number of years, finally brought the bank of the river practically to the toe of the Mississippi Levee, thus requiring that the latter be reconstructed, or that revetment be provided for its protection.

Previous projects.—None.

Existing project.—Initiated in 1911; provided for sufficient revetment to fix channel and bank conditions throughout the bend, thus making possible the retention of the adjacent levee.

Operations and results prior to the fiscal year.—During the years 1911, 1912, and 1913, 9,670 feet of standard fascine revetment were installed, at a total cost of \$429,383.58.

Operations and results during the fiscal year.—None.

Condition at the end of fiscal year.—During the past two high waters four pocket caves developed in the upper bank work which destroyed about 1,200 linear feet of bank paving. These pockets are quite deep, and to repair them will require large connecting mattresses in order to make good connection between the new shore line and the old subaqueous work in addition to bank paving and grading.

Local cooperation.—The Yazoo-Mississippi Delta Levee Board contributed to the cost of the work the sum of \$92,500.

Effect of improvement.—The river channel and bank throughout Sunflower Bend has been made generally stable, the adjacent levee guarded against destruction, and the construction of an extensive and costly levee loop has been avoided.

Proposed operations.—Repairs to the pocket caves mentioned above and the possible extension of the work downstream.

Mississippi River Commission, first and second districts—Data of cost of revetment June 1, 1916, to May 31, 1917.

Location.	Expended as per financial statement.	Debits to material on hand.	Credit by material on hand.	Total field cost.	Unit field cost.		Unit overhead cost.		Work accomplished.		Total cost of work.	Gross unit cost. ¹		Remarks.
					Per square.	Per linear foot.	Per square.	Per linear foot.	Squares. (†)	Linear feet.		Per square.	Per linear foot.	
Slough Landing Neck.	\$535.30 44,974.46		\$5,426.85	\$2,650.20 30,018.30	\$10.84	\$39.29	\$1.51	\$5.48	3,659	764	\$10,997.37 34,207.81	\$12.35	\$44.77	Grading and paving not completed on account of high water.
Gayoso Bend, Mo.	\$150,000.00 45,371.66		10,482.02	181,523.04	10.68		1.70		17,005	5,578	210,500.99	12.38		
Barfield, Ark.	\$1,545.98 132,422.35	\$1,918.12		133,301.07	11.01	38.36	1.82	6.34	12,112	3,475	155,351.09	12.83	44.70	Repairs to existing works.
Bullerton Bar, Ark.	\$20,041.39 124,316.67		741.72	\$34,485.10 106,061.75	9.85	36.50	1.49	5.58	14,466	2,960	\$39,553.47 124,550.85	11.34	42.06	
Star Landing, Miss.	\$11,186.42 19,894.15	2,490.23		32,423.97	14.04		2.42		2,170		37,670.61	17.36		Not completed on account of high water.
Delta, Miss.	92,446.83	13,937.49		\$19,763.30 86,300.24	10.20	39.86	1.61	6.30	10,398	2,165	\$22,839.16 99,936.43	11.81	46.16	
Old Town Bend.	58,720.24	17,581.40		74,673.78	10.23		1.77		7,299		87,570.64	12.00		

¹ Includes every item of field and overhead charges.

† Squares include both subaqueous and upper bank work.

* Amount expended for account of this work from allotment for "General repairs and stone".

† The cost of completing upper bank work on last season's work.

* Amount expended from contributed funds from Lower St. Francis Levee Board of Missouri.

II. EXPERIMENTAL REVETMENT.

From funds made available by the river and harbor bill approved July 27, 1916, the Mississippi River Commission allotted the sum of \$150,000 for the construction of one complete unit with which to place subaqueous concrete revetment with a view of substituting this type of shore protection for the standard willow fascine type.

Work of procuring the necessary plant is in progress; plans and specifications for the steel machinery barge and concrete mixing plant have been approved by the Chief of Engineers and bids invited on same. An order for the machinery, trusses, etc., for the operation of the plant has been placed with the Bucyrus Co. of South Milwaukee, Wis., and lumber for the construction of two slab barges purchased.

The scarcity and high price of steel shapes will doubtless delay the construction of the steel machinery barge beyond the possibility of accomplishing any concrete revetment work during the coming season.

III. WOLF RIVER.

Location.—Two hundred and thirty miles below Cairo, left bank.

The work of improving the Memphis Harbor by diverting the flow of Wolf River along the Memphis front has eliminated the necessity of further dredging in this stream; the project for its improvement may be regarded as completed.

For description and previous history, see Annual Report, Chief of Engineers, 1916, Part III, page 3408.

IV. LEVEES.

General.—All levees are being constructed to the grade and section fixed by the Mississippi River Commission by resolution adopted April, 1914, which provides that the grade shall be 3 feet above the deduced confined flood of 1912, with section having a crown 8 feet wide, river slope 8 to 1, land slope 3 to 1 to from 5 to 8 feet below crown, and thence a banquette of varying widths from 20 to 40 feet, dependent on the height of the levee, with back slope of 4 to 1.

(a) Upper St. Francis district.

Location.—On the right bank of the river from Cape Girardeau, Mo., 54 miles above Cairo, to New Madrid, Mo., 70 miles below. This district comprises an area of about 700 square miles.

Original condition.—The United States made its first levee expenditure in this district in 1899. At that time there existed fragments of levees constructed by local boards and individual land owners, but nothing to be dignified as a levee system. The most important of these several detached lengths of levee were found between Commerce and the Iron Mountain Railroad, and from Bird's Point for about 3 miles south. They merely joined the relatively higher ridges found variously along the upper St. Francis front and were capable of restraining only the mildest overflows.

Previous projects.—None.

Existing project.—The present project is to complete the levees to grade and section sufficient to protect the basin against overflow. This project was adopted in 1899. It has been modified from time to time, and at present contemplates the enlargement of the existing line, in cooperation with the State and local levee boards, to a grade 3 feet above the deduced confined flood of 1912, with section having a crown of 8 feet width, river slope 3 to 1, land slope 3 to 1 to 8 feet below crown, and thence a banquette of varying crown widths from 20 to 40 feet, dependent upon the height of the levee, with back slope of 4 to 1.

This levee line, when complete, will have a total length of about 87 miles.

Operations and results prior to the fiscal year.—During the year 1899 the Government's efforts were directed to the reconstruction and extension of the few miles of levee that existed from Bird's Point south. Upon the advent of the flood of 1903 but 5½ miles had been completed, which withstood the flood referred to without damage.

By the flood of 1907 the levee had been extended south to about Medley, approximately 26 levee miles below Birds Point. No levee damage was sustained from this high water, though the lower end of the basin was generally overflowed, due to the fact of unleveed low ground for about 2 miles between the lower end of the levee above referred to, and a length of levee, then under construction by the local board as far south as Dorena.

By 1912 the system had been extended north to Campbell's schoolhouse, with the exception of a small gap at Big Lake Crossing, and south to about Dorena, Mo., thus giving a continuous length of about 55 miles, with the exception noted. The elevations and sections of much of the line were seriously deficient for the restraint of such a flood as that of 1912, so that practically the entire system from Big Lake south was submerged. About 12 crevasses of size occurred, together with numerous small breaks and much top wash.

Again, upon the advent of the 1913 flood the system had been insufficiently developed, so that again very general damage resulted, including five serious crevasses, together with a number of minor breaks and extensive top wash.

Since 1913 to the beginning of the fiscal year all crevasses have been closed and the system strengthened materially, to the extent that very certain protection to the back country may be anticipated as to any but extreme floods. An open gap, of course, still remains from the lower end of the line to New Madrid, a distance of about 19 miles.

At the beginning of the fiscal year the United States had provided in the Upper St. Francis 4,211,239 cubic yards, at a total cost of \$1,017,167.05, including maintenance and high-water charges.

Operations and results during the fiscal year.—During the year the United States has added to the Upper St. Francis levees 84,961 cubic yards, and the local levee boards 423,139 cubic yards. The Government's expenditure for the year has been about \$47,208.69, and that of the local levee boards about \$117,143.71.

During the year the Mississippi County Levee Board No. 1 completed work on its contract for extension of the system, from mile 65/4 to 67/45. This contract involved 532,990 cubic yards, at a price of 15 cents per yard.

The St. Johns Levee and Drainage District has practically completed its contract for the construction of about 11 miles of levee, beginning just below New Madrid and running in a northeasterly direction to high ground.

This contract comprised 853,307 cubic yards, 788,897 of which has been placed.

The purpose of this operation is to prevent inflow into the Lower St. Francis basin around the head of its levee system. It is therefore virtually a part of the latter system, although not at this time connected. The yardage and cost involved are accordingly carried in Lower St. Francis tables.

Contract was executed by this office September 10, 1915, with the Oglesby Construction Co. for levee extension south toward New Madrid from the end of Mississippi Levee Board's contract above referred to, with time limit for completion December 31, 1917. The cost of the work has been provided for by available Government funds combined with a contribution by the St. Johns Levee and Drainage District of \$200,000. The contract will be executed by a tower drag line excavator, the erection of which, at the site of the work, was completed in May, 1916. This excavator is a development of the type of machine engaged for the past two seasons upon enlargement work near Scanlons, Ark. It will operate a bucket of 10-yard capacity to be dragged upon the ground from digging to dumping position, and is equipped with power estimated to be sufficient to insure a cycle of operation in from two to two and one-half minutes. It is not unreasonable to anticipate that this machine will execute the levee work to which assigned at the minimum rate of 200 cubic yards per working hour.

Contracts in force at the beginning of the year and those since executed are given in the following table, which includes a statement of the date, or percentage, of completion of each:

Location.	Class.	Miles from Cairo.	Cubic yards.	Price.	Contractor.	Date of completion and per cent completed May 31, 1917.
13-16/28	Enlargement	<i>Above.</i> 30 R.	164,384	<i>Cents.</i> 11.85	Robt. Nicholson & Co.	July 31, 1916.
13-13/20	do.	33 R.	18,069	26.95	R. L. Leonard	Dec. 2, 1916.
20-16-22/0	do.	26 R.	124,000	21.00	do.	28 per cent.
22-0-24/0	do.	24½ R.	200,000	26.95	do.	30 per cent.
24-0-26/15	do.	23 R.	176,000	21.00	do.	12 per cent.
67-45-68/21	New work	<i>Below.</i> 41 R.	170,000	20.00	Oglesby Construction Co.	19 per cent.
68-21-69/0	do.	41 R.	115,000	18.00	do.	Not begun.
69-0-69/27	do.	42 R.	140,000	16.00	do.	Do.
69-27-70/0	do.	42 R.	100,000	13.60	do.	Do.
70-0-70/28	do.	43 R.	102,000	12.00	do.	Do.
70-28-71/0	do.	43 R.	102,000	11.00	do.	Do.
71-0-71/28	do.	44 R.	100,000	10.00	do.	Do.
71-28-72/0	do.	44 R.	100,000	10.00	do.	Do.
72-0-72/28	do.	45 R.	158,000	16.58	do.	Do.
72-28-73/0	do.	45-48 R.	843,000	9.00	do.	Do.

Progress on the Oglesby Construction Co.'s contract has been, unfortunately, delayed, incident to the frequent recurrence of moderately high river stages.

Condition at the end of fiscal year.—The upper St. Francis levee system, completed to the 1914 commission grade, will involve an estimated total of 14,294,439 cubic yards, of which 6,381,303 cubic yards were in place at the end of the year.

The flood plane of the February, 1916, high water suggests the necessity that the grades of part of this system be raised, which will correspondingly increase the quantities just given.

Local cooperation.—The best available data would indicate that local authorities have provided to date in the construction of this levee system about 2,085,083 cubic yards, at a total cost of \$1,039,893.07. The amount stated comprehends not only actual construction, but all high-water expenses, charges for right of way, maintenance, administration, etc.

Proposed operations.—Continuation of levee extension and enlargement to the extent and at the rate that funds are made available. About 56 per cent of the project remains to be completed.

Effect of improvement.—Assured protection to about 660 square miles of territory against ordinary floods. As extension and enlargement proceed an increasing area will be similarly benefited with final and absolute protection of the entire district. 700 square miles, against estimated maximum floods, upon the consummation of the project.

Summary of yardage in place.

Provided by—	In place May 31, 1916.	Added during year.	In place May 31, 1917.	Under contract May 31, 1917.	Required to complete.
	<i>Cu. yds.</i>	<i>Cu. yds.</i>	<i>Cu. yds.</i>	<i>Cu. yds.</i>	<i>Cu. yds.</i>
United States	4,211,259	84,961	4,384,620	2,280,735	7,913,136
Levee boards	1,573,544	1,511,539	1,996,683	64,410	
Total	5,784,803	596,500	6,381,303	2,345,195	7,913,136

¹Credit given Mississippi County Levee Board No. 1 for \$34,000 contributed on the R. L. Leonard contract.

Plate No. 15 accompanies, showing present levee grades with relation to the established project grade.

(b) Reelfoot district.

Location.—This district is on the left bank of the river, extending from Hickman, Ky., 36 miles below Cairo, to upper Slough Landing Neck, Tenn., about 60

miles below Cairo. The levee system is continuous for a length of 21 miles and protects about 310 square miles of territory.

Original condition.—The United States initiated levee work in the Reelfoot district in 1902. At that time the basin was open with the exception that local authorities had constructed a levee from the Kentucky-Tennessee State line south to Slough Landing, a distance of about 4½ miles.

Previous projects.—None.

Existing project.—The original project provided for the construction of a levee from the Hickman bluffs south to the upstream end of the levee provided prior to 1902 by local authorities and the enlargement of the system to grade and section sufficient to protect the basin against overflow. This project was adopted in 1902. It has been modified from time to time, and at present contemplates the enlargement of the existing levee line in cooperation with the State and local levee boards to the grade and section adopted by the Mississippi River Commission April 19, 1914.

Operations and results prior to the fiscal year.—Beginning in 1902 construction was started at the Hickman Bluffs and continued as funds were available, until, by 1908, junction was made with the existing levee at the Kentucky-Tennessee State line.

Upon the advent of the flood of 1912 the system was, therefore, continuous, though deficient of grade and section to resist a flood of the magnitude involved; the result was a crevasse in the system by overtopping about 5 miles below Hickman, the entire basin being overflowed.

This crevasse was closed and the system materially strengthened upon the advent of the flood of 1913, which, under vigorous emergency measures, was successfully resisted, no damage to the levee line occurring except that incident to wave wash, etc., requiring but minor repair.

Prior to the present year the Government placed, in the Reelfoot system, a total of 1,781,395 cubic yards, at a total cost of \$418,482, including all maintenance and flood protection charges.

Operations and results during the fiscal year.—A contract was executed by the United States for the construction of a loop levee to blanket a part of the present levee which is threatened by caving on miles 3, 4, and 5. The details of this work are shown in the following table:

Location.	Class.	Miles below Cairo.	Cubic yards.	Price.	Contractor.	Completed May 31, 1917.
2/37-4/36.....	New work and banquette.	39 L.	336,000	Cents. 16.00	Rosch, Stansell, Lowrance Bros. & Co.	69 per cent.

Condition at the end of fiscal year.—The Reelfoot system, when completed, will involve a total of 4,028,000 cubic yards, of which 2,719,368 cubic yards were in place at the end of the year.

Local cooperation.—Local interests have thus far contributed a total of 861,204 cubic yards, at a cost of \$326,094.22, which includes all costs of actual construction, maintenance, high-water expenses, charges for right of way, general administration, etc.

Proposed operations.—A continuation of the enlargement of the system to final grade and section to the extent and at the rate that funds are made available. About 83 per cent of the Reelfoot project remains to be completed.

Effect of improvement.—The construction thus far accomplished affords assured protection from ordinary floods to the entire basin. As the system is progressively strengthened to completion, increased protection against overflow will be provided.

Summary of yardage in place.

Provided by—	In place May 31, 1916.	Added during year.	In place May 31, 1917.	Under con- tract May 31, 1917.	Required to com- plete.
	<i>Cu. yds.</i>	<i>Cu. yds.</i>	<i>Cu. yds.</i>	<i>Cu. yds.</i>	<i>Cu. yds.</i>
United States.....	1,781,395	76,769	1,858,164	102,981	1,308,632
Levee boards.....	704,954	156,250	861,204	.....
Total.....	2,486,349	233,019	2,719,368	102,981	1,308,632

¹ Credit given levee board for \$25,000 contributed on the Real-foot Loop.

Plate No. 16 accompanies, showing present levee grades with relation to the established project grade.

(c) Lower St. Francis district.

Location.—On the right bank of the river from just below New Madrid, Mo., 79 miles below Cairo, to the mouth of the St. Francis River, 298 miles below Cairo. Within the limits defined, the Lower St. Francis Levee is continuous for a length of 211 miles. About 3,500 square miles of territory are protected.

Original condition.—When the United States assumed levee interest in the Lower St. Francis district there existed along its front detached fragments of levee, constructed by local boards and private landowners, to guard against inflow through the swales and low places along the river bank. This condition had not assumed shape as a levee system, and was not expected to resist anything more than "out of bank water."

In referring to a map compiled in the second district in 1883, showing levee conditions throughout the St. Francis front, it is stated "the map shows that all the old levees were constructed to protect farming interests only"—presumably meaning purely local and detached farming interests.

Even as late as 1893 the conditions are described by the district officer to the effect that "water is practically free to escape from the banks into the low lands of the basins. The remnants of the old said levee, long since abandoned, which exist here and there along the whole length of the district, form no barrier to, and retard but little, the general escape of water from the banks."

"The overflows of the past few years have been very destructive, especially that of 1892, which, occurring very late in the season, made it impossible to make any crops whatever in many of the deeply submerged localities. The present overflow promises to be quite as disastrous as that of 1892."

Previous projects.—None.

Existing project.—The existing project was adopted in 1887 when 22 miles of levee were provided for, extending from Bear Bayou to Craighead Point, in connection with the improvement of Plum Point Reach. The project contemplates the construction and enlargement of the levees to a grade and section sufficient to protect the basin against overflow. It has been modified from time to time, and at present provides for the enlargement of the existing levee line in cooperation with the State and local levee boards to the grade and section adopted by the Mississippi River Commission April 19, 1914.

Operations and results prior to the fiscal year.—The first Government expenditure for levee purposes in this district was in connection with the Plum Point Reach improvement, and provided a levee from Bear Bayou to Craighead Point, to the end of suitably confining and directing flood waters throughout the reach.

No further levee construction of consequence was undertaken until between 1895 and 1897 when 115 miles were constructed to an elevation from 3 to 4 feet above the high water of 1882. This line extended from about Point Pleasant to Pecan Point. In every flood of consequence, prior to 1897, the entire basin was subjected to overflow, but it appears that in the flood of the last-named year the system had advanced to the point that about 700 square miles were afforded protection, notwithstanding a number of crevasses, stated to have aggregated a total length of 13,405 feet.

Prior to the flood of 1903 the system had been continued south from Pecan Point to Cat Island Bend, and a detached levee had been constructed from be-

hind Council Bend to the foot of Walnut Bend. In other words, in 1903 the system was continuous from Point Pleasant south for a distance of 173 miles followed by a gap of about 13 miles, where the second link of levee above referred to commence and extended downstream for a distance of about 17 miles. This last-named levee was started in the interest of preventing a cut-off between the Mississippi and St. Francis Rivers, and subsequently extended northward with the purpose of joining the system under extension to the south.

The system was deficient of sufficient height and section to resist the 1903 flood, with the result of two crevasses—one at Random Shot and one at Holly bush—aggregating a length of 2,935 feet. A large measure of protection was afforded the basin, however, as will be noted from the fact that the total area of overflow through the crevasses and through the levee gap below Cat Island as well as by way of backwater from the St. Francis River, amounted to but 1,230 square miles.

The system was continuous from Point Pleasant to below Walnut Bend, a distance of 218 miles, upon the advent of the flood of 1912, but was deficient of grade and section for the restraint of that unusual water. Three crevasses of magnitude and four of less moment resulted, and about 2,790 square miles of the basin was subjected to overflow. These breaks were promptly repaired, so that the line was again continuous to meet the 1913 flood, but was necessarily still deficient of grade and section for this water, whose flood plain, throughout the St. Francis front, was from 2 to 8 inches in excess of that in 1912. Again, four crevasses occurred and about 2,500 square miles of the basin were overflowed.

Following the flood of 1913 the crevasses of that year were immediately repaired, and to the beginning of the fiscal year a very large amount of enlargement work has been accomplished. Sufficient funds have been available by way of the Federal Government and the local levee boards to raise and strengthen practically all weak sections, so that a flood as great as that of 1912 or of 1911 might well be passed by the Lower St. Francis Basin, at least as far as Grave Bayou, 20 miles below Memphis.

To the beginning of the fiscal year the United States had provided 17,343,511 cubic yards in the Lower St. Francis levee system, at a total cost of \$4,027,605.04.

Operations and results during the fiscal year.—During the year the United States has enlarged the system to the extent of 869,119 cubic yards. The local levee boards have added 2,263,030 cubic yards. The Government's expenditure during the year has been \$197,673.51, and that of the local levee boards \$1,005,510.81.

Contracts in force at the beginning of the year, and those since executed, are given in the following table, which includes a statement of the date or percentage of completion of each:

Location.	Class.	Miles below Cairo.	Cubic yards.	Price.	Contractor.	Date of completion and per cent complete May 31, 1917.
48/4-49/49.....	New work and banquette.	130 R.	400,000	Cents. 18.5	Rodgers Bros.....	61 per cent.
97/20-101/0.....	Enlargement.....	188 R.	200,000	26.0	R. L. Leonard.....	14 per cent.
101/0-103/0.....	do.....	190 R.	135,251	15.38	S. M. Bush.....	Sept. 13, 1916
103/0-105/35.....	do.....	190 R.	211,063	15.38	do.....	Sept. 8, 1916
140/0-140/29.....	do.....	217 R.	109,823	19.5	Roach, Stansell, Lowrance Bros. & Co.	Aug. 29, 1916
140/29-141/0.....	Enlargement and banquette.	217 R.	134,019	19.5	do.....	Sept. 9, 1916
145/6-146/15.....	do.....	225 R.	440,000	21.8	Yale & Reagan.....	86 per cent.
146/15-147/8.....	do.....	225 R.	227,896	17.5	Roach, Stansell, Lowrance Bros. & Co.	48 per cent.
147/8-148/0.....	Enlargement.....	226 R.	138,768	17.0	W. T. & E. M. Lowrance & Co.	Sept. 19, 1916
150/48-152/45.....	Enlargement and banquette.	233 R.	218,706	15.0	T. G. Wood.....	July 6, 1916
155/0-157/18.....	Enlargement.....	239 R.	327,224	15.7	Bondurant, Callahan & Cheshire.	Sept. 12, 1916
157/19-160/0.....	do.....	247 R.	277,000	26.0	R. L. Leonard.....	14 per cent.
160/0-161/0.....	do.....	247 R.	84,760	15.0	R. H. & G. A. McWilliams.	July 25, 1916

Condition at the end of fiscal year.—The completed Lower St. Francis levee system will comprise 52,000,000 cubic yards. At the end of the year there had been placed a total of 43,869,142 cubic yards. The system is, therefore, about 84 per cent completed.

Local cooperation.—The best available data suggests a total expenditure to date by local interests of \$9,735,707.59, which includes actual construction, maintenance, high-water charges, right of way, general administration, etc.

Proposed operations.—A continuation of the enlargement in grade and section of the existing line to the extent and at the rate that funds are made available. About 16 per cent of the project remains to be completed.

Effect of improvement.—Practically the entire basin is protected from overflow against ordinary floods.

Summary of yardage in place.

Provided by—	In place May 31, 1916.	Added during year.	In place May 31, 1917.	Under con- tract May 31, 1917.	Required to complete.
	<i>Cu. yards.</i>	<i>Cu. yards.</i>	<i>Cu. yards.</i>	<i>Cu. yards.</i>	<i>Cu. yards.</i>
United States.....	17,343,510	869,119	18,212,629	744,646	8,139,858
Levee boards.....	23,393,483	2,263,030	25,656,513	221,530	
Total.....	40,736,993	3,132,149	43,869,142	966,176	8,139,858

Plates Nos. 17 and 18 accompany, showing present levee grades with relation to the established project grade.

(d) Upper Yazoo district.

Location.—This district is on the left bank of the river, and comprises the upper end of the State of Mississippi, from 244 to 305 miles below Cairo. The district's area is about 3,281 square miles.

Original condition.—The Mississippi River Commission first undertook levee work in this district in 1882, following the disastrous flood of that year. At the time of this flood the Upper Yazoo levee line was continuous from the Chickasaw Bluffs, below Memphis, south for a distance of about 117 miles. The line, however, was largely a coordination of plantation levees ununiform as to grade and section, and described at the time as being merely "up to low grade."

The flood of 1882 resulted in three crevasses of magnitude—at Parkers, Lake Charles, and Garth—in numerous small breaks, and much loss incident to top wash. The original condition of this system may, therefore, be briefly summarized as a levee line of 117 miles, capable of protecting the Upper Yazoo Basin from but the most moderate floods. It was wholly ineffective, and might as well have been nonexistent for the resistance of any flood waters approximating the stages of 1882, 1883, and 1884, during each of which years the entire basin was covered with the flood waters.

Previous projects.—None.

Existing project.—The existing project is to build and enlarge the levees to a grade and section sufficient to protect the basin against overflow. This project was adopted in 1882. It has been modified from time to time, and at date contemplates the enlargement of the existing levee line in cooperation with the State and local levee boards to the grade and section adopted by the Mississippi River Commission April 19, 1914.

Operations and results prior to the fiscal year.—The commission undertook, after the flood of 1882, to assist in the repair and enlargement of the system, though conditions were not radically improved to meet the floods of 1883 and 1884, during each of which the entire basin was overflowed.

In the high water of 1886 conditions were such that although three small crevasses occurred, but 98 square miles of the basin were flooded. Again, conditions were sufficiently improved to resist the waters of 1890 and 1891, with but one crevasse in each year, the area overflowed in 1890 amounting to but 50 square miles and in 1891 but 17 square miles.

The levees had been strengthened to fully resist the floods of 1892 and 1893, during which no crevasses were experienced.

By the flood of 1897, which practically equaled the Cairo stage of the flood of 1882, the system had rounded into an almost safe condition, so that but one crevasse resulted, flooding a total area of but 342 square miles. The commission and the local board had been working to levee grades 4 to 5 feet above the flood stages of 1882, though it is stated that upon the advent of the water of 1897 "a considerable portion of the line was still below grade 1 to 3 feet."

Since 1897 the most energetic and effective efforts have been applied to this system by the local board, assisted up to about 1908 by the commission, with the sole exception of its cooperation with the local board in the construction of the Sunflower loop in 1910-11. With the exception noted, no Federal expenditure has been made in this district for levee purposes since 1908.

The result has been gratifying, to the extent that the record floods of 1912 and 1913 were passed without crevasses and with but reasonable expenditures by the local board for precautionary measures.

Prior to the fiscal year the total Federal expenditure in this district for levee purposes has amounted to \$1,468,703.45.

Operations and results during the fiscal year.—The United States made no levee expenditure in the Upper Yazoo Basin during the year. The levee board added to the system 1,622,783 cubic yards.

Condition at the end of fiscal year.—The completed system will comprise a total of 41,632,000 cubic yards, of which 38,106,392 cubic yards, or about 91 per cent, are in place.

Local cooperation.—The Upper Yazoo Levee Board has expended to date a total of \$12,965,226.69, which comprehends all costs of construction, maintenance, high-water expenditures, right of way, administration, etc. The present outlook is that no further Federal expenditure will be required, the resources of the local board being such as to fully provide for the district's needs.

Proposed operations.—None.

About 91 per cent of the project is completed. The balance will, in all probability, be provided for by local interests.

Effect of improvement.—The Upper Yazoo Basin has been made entirely safe against all floods, except, perhaps, the extremest. In the event of the latter, vigorous emergency work will in all likelihood prevent crevasse of the system or overflow of the basin.

Summary of yardage in place.

Provided by—	In place May 31, 1916.	Added during years.	In place May 31, 1917.	Under con- tract May 31, 1917.	Required to complete.
	<i>Cu. yds.</i>	<i>Cu. yds.</i>	<i>Cu. yds.</i>	<i>Cu. yds.</i>	<i>Cu. yds.</i>
United States.....	7,686,756		7,686,756		3,525,608
Levee boards.....	29,208,253	1,622,783	30,419,636	3,067,624	
Total.....	36,895,009	1,622,783	38,106,392	3,067,624	3,525,608

¹ 411,400 cubic yards thrown out by new loops at Norfolk and Commerce Landings deducted from yardage in place.

Plates Nos. 20 and 21 accompany, showing present levee grades with relation to the established project grade.

(e) White River district.

Location.—On the right bank of the river from Helena, Ark., to and including a part of Laconia Circle, from 306 to 385 miles below Cairo. The area of the basin amounts to 910 square miles.

Original condition.—The first expenditure of the United States in the White River district was made in 1887, at which time it is stated that 30 miles of levee "built to low grade" were in existence. These 30 miles presumably comprised a stretch of levee from Helena south, another from the vicinity of Laconia north, and such intermediate plantation levees as were considered to be of any value.

There is no reliable record of the location or condition of the White River levees at the time in question. It is reported that the entire basin was over-

flowed in the floods of 1882, 1883, and 1884, but that about 400 square miles were unaffected by the flood of 1886.

Previous projects.—None.

Existing project.—The existing project is to build and enlarge the levees to a grade and section sufficient to protect the basin against overflow. This project was adopted in 1887. It has been modified from time to time, and at present contemplates the enlargement of the existing levee line in cooperation with the State and local boards to the grade and section adopted by the Mississippi River Commission, April 19, 1914.

Operations and results prior to the fiscal year.—In 1887, under a first allotment of \$75,000 by the Mississippi River Commission, the enlargement of the White River system from Helena south was commenced. It is stated that in that year, in cooperation with the local authorities, about 14½ miles of levee were enlarged. The grade adopted was "2 feet above the high water of 1886—the highest in this section."

Construction and enlargement proceeded from Helena south and from Laconia north to a closure just prior to the high water of 1897. The line was wholly insufficient, however, to restrain the flood of that year, so that 14 crevasses occurred, of an aggregate length of 16,420 feet, and the entire basin was overflowed.

These crevasses were not all finally closed until 1905, though Federal and local expenditures for their closure and for the enlargement of portions of the system were made in the meantime. In this regard it was stated "the levee in this district was generally low, particularly in the lower half of the district, where the greater part is below the recent flood and had to be topped, and until the levee is considerably enlarged it is not deemed advisable to close the 1897 breaks." The flood of 1903, passing through the old crevasses, still unclosed, overflowed 768 square miles of the basin. The moderate flood of 1906 was passed without incident.

The system successfully resisted the flood of 1907, and thus remained intact until the flood of 1912, when two large and four small crevasses, aggregating a length of 6,595 feet, occurred with resultant overflow of 850 square miles of the district. These 1912 crevasses were promptly closed and the system was again continuous upon the advent of the 1913 flood, as to which, by vigorous emergency measures, breaks were prevented from Helena south to Knowltons, a distance of 52 miles. Below and including the Knowltons break four crevasses of size were experienced, with considerable damage to the entire Laconia Circle Levee, incident to small breaks and top wash.

These 1913 crevasses were closed during the fiscal year 1915.

The total Federal expenditure in the White River district prior to the fiscal year amounted to \$2,914,442.06.

Operations and results during the fiscal year.—The United States enlarged the system during the year by an aggregate of 545,978 cubic yards. In the same period the local levee boards have provided 372,789 cubic yards in enlargement and banquettes. The expenditure of the United States during the year has been \$113,458.49, and that of the local levee boards \$186,277.

Contracts in force at the beginning of the year and those since executed are given in the following table, wherein is shown the date, or per cent, of completion of each:

Location.	Class.	Miles below Cairo.	Cubic yards.	Price.	Contractor.	Date of completion and per cent completed May 31, 1917.
20-22/32.....	Enlargement.....	327 R	108,480	<i>Cents.</i> 18.24	Zeb C. Nolan, executor of estate of J. M. Sullivan.	Dec. 31, 1916.
27-29/4.....	do.....	328 R	130,644	16.45	F. L. Carter contract annulled; relet to Roach & Stansell.	Nov. 25, 1916.
29-31/18.....	New work.....	337 R	250,000	21.30	Rodgers Bros.....	54 per cent.
29-34/0.....	Enlargement.....	342 R	284,099	18.20	do.....	85 per cent.
34-36/0.....	do.....	342 R	300,000	18.20	do.....	79 per cent.
34-37/0.....	do.....	344 R	150,000	29.70	do.....	Not begun.

Conditions at the end of fiscal year.—The White River Levee system completed will total 28,511,000 cubic yards, of which 16,052,663 cubic yards, or about 56 per cent, is in place.

Local cooperation.—The several levee boards concerned with the White River system have expended thereon to date a total of \$1,727,317.40, which includes all costs of construction, maintenance, high water expenditures, rights of way, general administration, etc.

Proposed operations.—Continuation of the enlargement to the project grades and sections of the Mississippi River Commission to the extent and at the rate that funds are made available. About 44 per cent of the project remains to be completed.

Effect of improvement.—The White River basin may be assumed to be fully protected only against moderate floods. Increased protection will accrue at the rate and to the extent that future expenditures provide for the increase of grade and section toward the standards established by the Mississippi River Commission.

Summary of yardage in place.

Provided by—	In place May 31, 1916.	Added during year.	In place May 31, 1917.	Under con- tract May 31, 1917.	Required to complete.
	<i>Cu. yds.</i>	<i>Cu. yds.</i>	<i>Cu. yds.</i>	<i>Cu. yds.</i>	<i>Cu. yds.</i>
United States.....	11,425,779	545,978	11,971,757	371,827	12,458,337
Levee boards.....	3,849,725	372,789	4,222,514	122,700	
Total.....	15,275,504	918,767	16,052,663	494,527	12,458,337

¹ 141,908 yards deducted from total, having been thrown out during the year by Fair Loop.

Plate No. 19 accompanies, showing present levee grade with relation to the established project grade.

Flood conditions.—The highest river stages attained at the principal gauge points of these districts throughout the year are shown below:

	Feet.
Cairo, Apr. 4-5.....	50.1
New Madrid, Apr. 5-7.....	39.3
Fulton, Apr. 9.....	37.2
Memphis, Apr. 10.....	40.4
Mhoons, Apr. 10-12.....	42.3
Helena, Apr. 12-13.....	49.9
Mouth White River, Apr. 14-18.....	51.6

Precautionary patrol and distribution of emergency supplies, when necessary, were arranged for by the local authorities throughout all levee districts. The flood was passed without damage to the levee systems or expense to the United States Government.

Levee situation in general.—The following table briefly summarizes conditions and future requirements of the several levee systems within the first and second districts:

Levee district.	Lost or abandoned during year.	Contents, 1917.	Required to complete.	Estimated final contents.	Per cent now built.	Approximate area protected.
	<i>Cu. yds.</i>	<i>Cu. yds.</i>	<i>Cu. yds.</i>	<i>Cu. yds.</i>		<i>Sq. miles.</i>
Upper St. Francis.....		6,381,303	7,913,136	14,294,439	44	700
Lower St. Francis.....		43,869,142	8,139,858	52,009,000	84	3,500
White River.....	141,608	16,052,663	12,468,337	28,511,000	67	910
Reelfoot.....		2,719,368	1,308,632	4,028,000	56	310
Upper Yazoo.....	411,400	38,106,392	3,525,008	41,632,000	91	3,281

V. SURVEYS.

Revetment surveys.—The annual surveys were made between September 11, 1916, and June 12, 1917.

The original base lines were retraced and soundings taken on fixed ranges 200 feet apart; in each bend where revetment had been placed shore lines were

run above and below the work as far as active caving was encountered; soundings were also made on fixed ranges 1,000 to 1,500 feet apart within these reaches.

The detailed information developed by these surveys will be found in the several paragraphs relating to revetment conditions.

Reach and bank line surveys.—The following reaches were surveyed: Slough Landing Neck, Ky. and Tenn. (55–65 L.); New Madrid Bend and Point Pleasant Reach (65–85 L. and R.); Gayoso Bend and Caruthersville, Mo. (100–115 R.); Barfield, Ark. (138–145 R.); Plum Point (147–168 L. and R.); Golden Lake, Ark. (190–200 R.); Memphis, Tenn. (221–240 L. and R.); Star Landing, Miss. and Porter Lake, Ark. (255–265 L. and R.); Walnut Bend, Ark. (281 R.); Trotters Point, Miss., and Helena, Ark. (303–310 L. and R.); Delta, Miss. (312–316 L.); Oldtown, Ark. (323–328 R.); Sunflower, Miss. (350–358 L.).

Bank lines were secured throughout the following unrevetted reaches, to the end of compiling information as to their future revetment or other requirements: Hickman, Ky. (38–44 L.); Bend of Island 8, Mo. (45–50 R.); Stewarts Landing, Mo. (90–93 R.); Bells Point, Mo. (112 R.); Cottonwood Point, Mo. (122 R.); Huffman, Ark. (128–133 R.); Pecan Point, Ark. (196 R.); Hopefield Point, Ark., to Wyanoka, Ark. (230–240 R.); Graves Bayou to Cat Island, Ark. (250–254 R.); Commerce, Miss. (263–266 L.); Moon Bend, Miss. (275–280 L.); Fox Island Bend, Miss. (285–290 L.); Hardins Point, Ark. (290 R.); O. K. Bend, Miss. (291–295 L.); St. Francis Bend, Ark. (293–298 R.); Friar Point, Miss. (317–320 L.); Dawson, Ark., to Offuts, Ark. (343–346 R.); Sunflower, Miss., to Lake Charles, Miss. (352–357 L.).

In addition to the annual surveys described above, a survey was made in compliance with a resolution of the Mississippi River Commission of the Ohio River from the Cairo City elevator up to the mouth of the Cache River, with a view of determining the rate of bank caving and the extent of scour in the river.

This survey was made between September 16, and 27, 1916. The report and maps were submitted to the president Mississippi River Commission on November 1, 1916.

VI. PLANT.

New plant.—The following additions to plant have been made during the year at the costs indicated:

<i>Vas. 1701 to 1707, inclusive, creosoted wooden material barges (under construction). Construction cost during the year</i>	\$31,928.23
<i>Vas. 1708 and 1709, creosoted wooden flats (under construction). Construction cost during the year</i>	1,570.65
<i>Vas. 1711 to 1713, inclusive, creosoted wooden concrete mat barges (under construction). Construction cost during the year</i>	7,490.83
<i>Vas. 1714 to 1719, inclusive, creosoted wooden sand barges (under construction). Construction cost during the year</i>	4,066.77
<i>No. 1208, floating concrete mixing plant (alterations and additions). Completed at a total cost during the year</i>	16,079.02
<i>Steamer Wyanoka (by transfer)</i>	20,000.00
<i>Vas. 2, 3, 5, 6, quarterboats (by transfer)</i>	12,000.00
<i>No. 1, pile driver (by transfer)</i>	1,800.00
<i>Vas. 122, 126, 128, 131, 133, 134, 135, 137, 212, 214, 216, 217, barges (by transfer)</i>	18,000.00
<i>Stokers, steamer Minnetonka (purchased)</i>	1,500.00
<i>Skiffs, five purchased</i>	206.98
<i>Tools and appliances, outfits, etc.</i>	9,749.28
<i>Unexpended material on hand</i>	2,813.10

Total..... 127,204.86

Concrete revetment plant (machinery for plant is now under contract)..... 28,740.00

Lumber and miscellaneous material (under contract for completion of barges)..... 30,160.04

Plant decreased.—The plant has been decreased during the year by the following items:

Dropped by inventory and inspection: Barges No. 9305, No. 9317, No. 9323, No. 9326, No. 9328, No. 0502, and model barge No. 9407.

Dropped on affidavit: Hydraulic grader No. 9313 and skiff No. 17.

Repairs to plant.—Repairs to the following items of plant have been made during the year at the costs stated:

Steamer <i>Minnetonka</i> : Side stokers installed; furnace arches and walls rebuilt; boilers repaired; new stacks built; general running repairs.....	\$4,550.84
Steamer <i>Wynoka</i> : Received new towing, stationary, and swinging fenders; wheel repaired and rebuilt; straightened pitmans and cylinder beams; rudders repaired; new head block installed; machinery and boilers overhauled; general running repairs.....	2,790.96
Steamer <i>Chisca</i> : Received new rudder and rudder stock; new exhaust pipe; new scuppers; repaired larboard cylinder timber; new fantail; new wheel chain brace; repairs to after boiler beam; new mud drum stand foundations; repairs to outriggers, nosing, and plank shear; cabin floor repaired; boiler-deck nosing repaired; fusible plugs renewed in boiler; machinery overhauled; general running repairs.....	1,468.91
Steamer <i>Graham</i> : Received new fenders; guards repaired; wheel repaired; minor repairs to machinery; general running repairs.....	810.35
Steamer <i>Search</i> : Docked; head, sides, and guards rebuilt; bottom calked; machinery repaired and lued up; wheel repaired; general running repairs.....	5,719.31
Steamer <i>Itasca</i> : Boat raised, docked, and cleaned; repairs to hull and cabin; machinery overhauled; wheel rebuilt twice; shaft repaired; new pitmans and repairs made to crossheads; general running repairs.....	4,807.86
Steamer <i>Augustus J. Nolty</i> : Two new wrist pins made and installed; engines lined up; air pump bushed; capstan engine repaired; cabin repaired; tiller box and wheel repaired; general running repairs.....	1,031.00
Steamer <i>W. M. Rees</i> : New feed-water heater installed; Snowden heaters overhauled and repaired; bushing renewed in air pump; wheel repaired; circulating pump overhauled; general running repairs.....	1,060.10
Steamer <i>Maude Kilgore</i> : Cylinder timbers repaired; repairs to speaking tubes and wheel; new bunks installed; general running repairs.....	228.46
Steamer <i>Mercury</i> : Received minor repairs.....	20.67
Steamer <i>Saturn</i> : Received minor repairs.....	47.83
Steamer <i>Venus</i> : Received minor repairs.....	35.00
Dredge <i>Iota</i> : New discharge-pipe straps made; minor repairs.....	78.19
Launch <i>Opelika</i> : Motors, generator, and heating system overhauled; screens and roof renewed; new piston rings and propellers installed; general running repairs.....	2,386.80
Hydraulic grader No. 1022: Minor repairs to discharge valves.....	46.40
Hydraulic grader No. 1205: Addition to cabin built; turbines and pumps and electric light plant repaired; minor repairs to valves.....	1,926.76
Hydraulic grader No. 1401: Pumps and light plant overhauled; minor repairs.....	552.68
Sand and gravel digger No. 1407: Minor repairs to pump.....	16.75
Concrete mixing plant No. 1208: Purchased under contract of steel pontoon; taken out on ways and pontoon connected to hull; old derrick and bins removed; new bins, sand elevator, sack elevator, and nigger boiler erected; steam capstans installed.....	16,601.33
Derrick boat No. 3: New steel stiff legs built and erected, cabin repaired, machinery overhauled, new flues put in boiler.....	942.06
Derrick boat No. 1017: Minor repairs made to engine.....	22.45
Derrick boat No. 1411: Steel mast repaired, hoisting engine overhauled.....	467.13
Pile driver No. 4: Received minor repairs to hull.....	4.34
Machine shop No. 1: Work on new boiler completed and boiler erected, hog chains and braces installed, cabin and guards repaired, steam pipe covered, repairs to feed pump, general repairs.....	2,802.10
Floating dock: Repairs made to top gunwale strake, gates repaired and calked, minor repairs.....	182.25
Coal loader No. 9309: Sides and rakes calked afloat.....	65.10

Locomotive Crane: General repairs to engines; new flues installed in boiler; driving gear repaired.....	\$951.89
Cresote Tanks: Tanks repaired; pipe line tightened up; boiler repaired and fusible plugs renewed; tank coils repaired.....	108.17
Quarterboat No. 5: Received new fenders; guards repaired; stoves and ranges repaired.....	157.16
Quarterboat No. 6: Minor repairs to hot-water boiler.....	25.50
Quarterboat No. 8: Received new timberheads; repairs made to cabin, guards, and stovepipes; sides and rakes calked afloat.....	196.42
Quarterboat No. 11: Roof repaired; repairs made to guards.....	31.25
Quarterboat No. 12: New roof put on; new timberheads installed; repairs made to guards; sides and rakes calked afloat.....	852.66
Quarterboat No. 25: Received minor repairs.....	40.35
Carpenter shop No. 26: Docked; repairs made to bottom, sides, rakes, and guards.....	1,834.88
Quarterboat No. 27: Work on new hull completed; cabin transferred; minor repairs to cabin; toilet fixtures overhauled.....	2,450.33
Quarterboat No. 0601: Toilet fixtures installed; repairs to cabin, stoves, and ranges.....	281.41
Quarterboat No. 1020: Received new stationary fenders; guards, stoves, and ranges repaired.....	215.50
Quarterboat No. 1021: Received minor repairs.....	66.65
Barge mattress No. 5: Docked; repairs made to hull and ways; new stanchions put in and repairs made to bottom; hull calked.....	488.45
Barge mattress No. 6: Docked; side straightened; repairs made to bottom, ways, and fingers; hull calked.....	478.12
Barge mattress No. 9312: Received minor repairs.....	62.54
Barge mattress No. 0703: Received minor repairs to ways.....	60.04
Barge mattress No. 1501: Ways rebuilt.....	1,152.57
Barge mattress No. 1502: Ways rebuilt.....	1,090.44
Barge, mooring, No. 1: Sides and rakes calked afloat.....	46.80
Barge, mooring, No. 1224: Received minor repairs.....	28.74
Barge, mooring, No. 1225: Received minor repairs.....	35.33
Barge, model, No. 122: Sides patched and minor repairs.....	61.25
Barge, model, No. 163: Docked; side patched; bottom calked.....	175.38
Barge, model, No. 214: Minor repairs; barge sunk.....	12.53
Barge No. 9315: Deck patched; rakes calked.....	190.20
Barge No. 9319: Deck patched; sides and rakes calked.....	190.20
Barge 9325: Deck patched; sides and rakes calked.....	148.00
Barge No. 0805: Docked; rakes patched; sides and rakes calked.....	429.70
Barge No. 0806: Repairs to air compressor and boiler; sides and rakes calked.....	187.12
Barge No. 0807: Received minor repairs.....	37.63
Barge No. 0809: Fascine platform built; rakes calked.....	105.86
Barge No. 1004: Cement storage house built.....	475.91
Barge No. 1009: Dismantling machinery; patching deck; rakes and sides calked afloat.....	508.31
Barge No. 1101: Sand bins erected; sides and rakes calked.....	199.97
Barge No. 1201: Cement storage house built.....	499.90
Barge No. 1202: Scraping and painting hull.....	13.75
Barge No. 1305: Received new tie rods and timberheads; rakes and sides calked.....	436.08
Barge No. 1307: Received minor repairs.....	22.17
Barge No. 1310: Docked; hull scraped and painted.....	109.35
Barge No. 1316: Docked; hull scraped and painted.....	124.71
Barge flat No. 4: Sides, rakes, and deck repaired.....	316.67
Calking flat No. 1: Rebuilt.....	58.80
Stiffs: Overhauled.....	270.00
Miscellaneous: Repairs were made to tools and appliances at various times, for construction parties and fleet use; repairs to ranges, stoves, wheelbarrows, pumps, furniture, etc.....	2,441.88
Total	66,270.80

The following shows the original cost, the repair, and depreciation during the year, and the present estimated value of all plant employed in the first and second Mississippi River districts:

Name.	No.	Original cost.	Valuation last year.	Repairs.	Depreciation.	Present value.
Barge, model.....	1	\$3,847.00	\$1,500.00	\$61.25	\$220.82	\$1,326.93
Do.....	1	2,885.00	1,500.00		173.10	1,326.93
Do.....	1	3,590.00	1,500.00		215.40	1,326.93
Do.....	1	3,590.00	1,500.00		215.40	1,326.93
Do.....	1	3,650.00	1,500.00	175.38	219.00	1,326.93
Do.....	1	3,650.00	1,500.00		219.00	1,326.93
Do.....	1	3,650.00	1,500.00		219.00	1,326.93
Do.....	1	3,650.00	1,500.00		219.00	1,326.93
Do.....	1	3,800.00	1,500.00		228.00	1,326.93
Do.....	1	3,597.00	1,500.00	12.53	215.82	1,326.93
Do.....	1	3,597.00	1,500.00		215.82	1,326.93
Do.....	1	3,597.00	1,500.00		215.82	1,326.93
Barge (coal loader).....	1	3,170.00	3,547.47	65.10	158.50	3,494.07
Barge, decked.....	1	3,170.00		190.20	190.20	2,715.77
Do.....	1	3,170.00	2,903.90		190.20	2,715.77
Do.....	1	3,170.00		190.20	190.20	2,715.77
Do.....	1	2,468.67		148.00	148.00	2,183.47
Do.....	1	2,468.66	2,331.38		148.00	2,183.47
Do.....	1	5,727.53	3,231.97		296.38	2,945.62
Do.....	1	5,727.53	3,140.87		296.38	2,945.62
Do.....	1	5,727.53	3,317.07		296.38	3,030.61
Do.....	1	5,727.53	3,171.97		296.38	2,894.61
Do.....	1	3,531.50	885.82	429.70	211.80	903.40
Do.....	1	3,531.51	997.84	187.12	211.80	973.41
Do.....	1	5,624.70	1,825.01	37.63	281.24	1,591.44
Do.....	1	5,624.70	1,803.60		281.24	1,522.44
Do.....	1	5,624.70	1,772.98	105.86	281.24	1,597.44
Do.....	1	5,727.53	3,140.59		296.38	2,854.61
Do.....	1	5,569.58	3,196.66		278.48	2,917.10
Do.....	1	5,569.58	3,232.52		278.48	2,944.04
Do.....	1	4,212.00	3,119.31		212.10	2,907.21
Do.....	1	4,212.00	3,006.95		212.10	2,794.85
Do.....	1	4,212.00	3,015.35		212.10	2,803.25
Do.....	1	4,212.00	3,032.15	475.91	212.10	3,295.14
Do.....	1	4,050.00	3,108.39		202.50	2,903.89
Do.....	1	4,050.00	3,031.97		202.50	2,829.47
Do.....	1	4,246.58	3,231.44		212.33	3,019.11
Do.....	1	4,246.58	3,144.94		212.33	2,932.61
Do.....	1	4,246.58	3,307.82	508.31	212.33	3,603.80
Do.....	1	4,246.58	3,148.10		212.33	2,933.77
Do.....	1	4,246.58	3,205.99		212.33	2,998.66
Do.....	1	4,246.58	3,141.90		212.33	2,929.57
Do.....	1	4,300.00	3,276.58	199.97	215.00	3,261.55
Barge, steel.....	1	8,900.00	7,424.47	499.90	356.00	7,568.94
Do.....	1	8,900.00	7,279.38	13.75	356.00	6,987.11
Do.....	1	8,900.00	7,372.34		356.00	7,016.64
Do.....	1	8,900.00	7,331.99		356.00	6,975.99
Do.....	1	8,900.00	7,382.63		356.00	7,006.63
Do.....	1	8,900.00	7,334.73		356.00	6,978.73
Do.....	1	8,900.00	7,309.74		356.00	6,953.74
Do.....	1	8,900.00	7,432.12		356.00	7,078.12
Do.....	1	8,900.00	7,121.62		356.00	6,765.62
Do.....	1	8,900.00	7,121.62		356.00	6,765.62
Do.....	1	8,900.00	7,401.62		356.00	7,045.62
Barge, decked.....	1	4,194.00	3,391.37		209.70	3,181.67
Do.....	1	4,194.00	3,530.57		209.70	3,320.87
Do.....	1	4,194.00	3,284.27		209.70	3,074.57
Do.....	1	4,194.00	3,358.40		209.70	3,148.70
Do.....	1	4,194.00	3,226.85		209.70	3,017.15
Do.....	1	4,194.00	3,303.15		209.70	3,093.45
Do.....	1	4,194.00	3,313.73		209.70	3,104.03
Do.....	1	4,773.15	3,944.89		238.66	3,706.23
Do.....	1	4,773.15	3,818.53		238.66	3,579.87
Do.....	1	4,773.15	3,900.44		238.66	3,661.78
Do.....	1	4,773.15	3,896.74	436.08	238.66	4,094.16
Do.....	1	4,773.15	3,850.74		238.66	3,621.08
Barge, steel.....	1	8,500.00	7,249.00	22.17	340.00	6,931.13
Do.....	1	8,500.00	7,258.36		340.00	6,918.36
Do.....	1	8,500.00	7,249.00		340.00	6,909.00
Do.....	1	8,500.00	7,249.00	109.35	340.00	7,018.35
Do.....	1	8,500.00	7,249.00		340.00	6,909.00
Do.....	1	8,500.00	7,249.00		340.00	6,909.00
Do.....	1	8,500.00	7,249.00	124.71	340.00	7,033.71
Do.....	1	8,500.00	7,249.00		340.00	6,909.00
Do.....	1	8,500.00	7,249.00		340.00	6,909.00
Barge, decked.....	1	4,500.00	3,865.83		225.00	3,740.83
Do.....	1	4,500.00	4,063.88		225.00	3,838.88
Do.....	1	4,500.00	4,273.24		225.00	4,048.24
Do.....	1	4,500.00	3,933.57		225.00	3,708.57
Do.....	1	4,500.00	3,974.51		225.00	3,749.51
Do.....	1	4,500.00	3,924.87		225.00	3,699.87
Do.....	1	4,500.00	4,063.35		225.00	3,838.35

1 Sunk; will be dropped on affidavit.

Name.	No.	Original cost.	Valuation last year.	Repairs.	Depreciation.	Present value.
Barge, mattress.....	1	\$4,530.00	\$2,533.19	\$483.45	\$226.50	\$2,790.14
Do.....	1	4,530.00	2,488.01	478.12	226.50	2,739.63
Do.....	1	2,800.00	5,404.66	.....	140.00	5,264.66
Do.....	1	2,800.00	5,520.23	62.54	140.00	5,442.77
Do.....	1	5,120.00	4,094.37	.....	256.00	3,838.37
Do.....	1	5,120.00	4,269.11	60.04	256.00	4,073.15
Do.....	1	4,642.91	3,567.14	.....	232.15	3,334.99
Do.....	1	4,642.91	3,566.58	.....	232.15	3,334.43
Do.....	1	6,992.03	5,873.33	1,152.57	349.60	6,676.31
Do.....	1	6,992.02	5,873.33	1,090.44	349.60	6,614.17
Barge, mooring.....	1	2,023.00	611.63	46.80	121.38	537.05
Do.....	1	2,023.00	612.42	.....	121.38	491.04
Do.....	1	3,560.00	2,641.97	.....	178.00	2,463.97
Do.....	1	3,780.00	2,788.71	.....	189.00	2,599.71
Do.....	1	3,560.00	2,652.91	28.74	178.00	2,503.65
Do.....	1	3,780.00	2,795.78	35.33	189.00	2,642.11
Barge, flat.....	1	480.00	.....	316.67	23.00	293.67
Do.....	1	499.80	402.01	.....	24.99	377.02
Do.....	1	743.04	606.81	.....	37.15	569.66
Do.....	1	743.04	612.62	.....	37.15	575.47
Do.....	1	743.04	618.06	.....	37.15	580.90
Derrick boats.						
No. 3.....	1	2,956.00	4,488.93	942.06	177.36	5,253.63
No. 1017.....	1	5,959.40	4,539.04	22.45	297.97	4,263.52
No. 1411.....	1	8,481.70	8,060.50	467.13	424.09	8,108.54
Quarterboats:						
No. 2.....	1	5,200.00	3,000.00	.....	312.00	2,688.00
No. 3.....	1	5,200.00	3,000.00	.....	312.00	2,688.00
No. 5.....	1	5,200.00	3,000.00	187.16	312.00	2,845.16
No. 6.....	1	5,200.00	3,000.00	25.50	312.00	2,713.50
No. 8.....	1	3,645.00	2,670.01	196.42	218.30	2,648.13
No. 11.....	1	3,645.00	1,621.89	31.25	218.30	1,434.84
No. 12.....	1	3,645.00	2,747.06	852.66	218.30	3,381.42
No. 25.....	1	3,645.00	1,271.74	40.35	218.30	1,093.79
No. 26.....	1	3,645.00	1,790.98	1,894.88	218.30	3,397.56
No. 27.....	1	2,788.00	1,711.85	2,450.33	139.40	4,022.78
Amelia.....	1	2,741.00	1,433.11	.....	164.46	1,268.65
No. 206.....	1	4,900.00	3,720.31	.....	245.00	3,475.31
No. 221.....	1	4,900.00	4,142.65	.....	245.00	3,997.65
No. 0601.....	1	3,059.00	2,034.17	231.41	162.95	2,112.63
No. 1020.....	1	9,889.11	6,485.63	215.50	494.46	6,206.67
No. 1021.....	1	9,889.11	6,486.61	66.65	494.46	6,058.80
No. 1301.....	1	5,800.00	4,666.19	.....	290.00	4,375.19
No. 1402.....	1	10,399.94	8,366.42	.....	520.00	7,845.42
Hydraulic graders:						
No. 2.....	1	30,232.00	.....	.....	(1)	(1)
No. 9313.....	1	9,212.00	1,066.22	.....	1,065.22	.....
No. 1022.....	1	15,900.00	12,734.57	46.40	786.00	11,985.97
No. 1205.....	1	31,721.07	29,725.52	1,926.76	1,286.84	30,383.44
No. 1401.....	1	32,802.63	29,748.01	552.68	1,312.11	28,988.58
Sand digger No. 1407.....	1	12,445.00	12,307.64	16.75	672.25	11,652.14
Concrete-mixing plant No. 1208.....	1	25,000.00	35,438.58	522.31	1,000.00	37,960.80
Floating dock.....	1	9,475.00	1,026.78	132.25	567.50	591.53
Machine shop No. 1.....	1	8,501.00	7,279.15	2,802.10	510.06	9,571.19
Pile driver No. 4.....	1	4,500.00	1,800.00	4.34	270.00	1,534.34
Towboats:						
Mimetonika.....	1	40,000.00	23,557.50	3,069.84	2,400.00	24,217.34
Wynoka.....	1	45,672.00	20,000.00	2,790.96	1,826.88	20,964.08
Chisca.....	1	25,900.00	27,995.78	1,468.91	1,554.00	27,910.69
Graham.....	1	9,500.00	20,757.68	810.35	570.00	20,998.08
Search.....	1	9,000.00	6,582.22	5,719.31	540.00	11,761.53
Itasca.....	1	9,500.00	5,099.53	4,807.96	380.00	9,627.39
Augustus J. Nolty.....	1	34,735.00	32,102.26	1,031.60	1,389.40	31,744.46
W. M. Rees.....	1	34,735.00	32,937.14	1,090.10	1,389.40	32,687.84
Maudie Kilgore.....	1	(a)	.....	228.46	228.46	.....
Mercury.....	1	(c)	.....	20.67	20.67	.....
Saturn.....	1	(c)	.....	47.83	47.83	.....
Venus.....	1	(c)	.....	35.00	35.00	.....
Dredge Iota.....	1	(c)	.....	78.19	78.19	.....
Launch Opelika.....	1	5,000.00	7,974.34	2,386.80	300.00	10,061.14
Skiffs.....	24	870.00	362.98	270.00	52.25	580.73
Calving flat.....	1	20.00	19.60	58.80	1.20	77.20
Boats, metallic.....	3	180.00	150.00	.....	7.20	142.80
Boats, life.....	2	170.00	141.67	.....	6.80	134.87
Cresote tanks.....	2	1,347.37	826.54	108.17	53.89	880.82
Locomotive crane.....	1	7,125.00	6,428.84	951.89	1,187.50	6,193.23
Concrete revetment plant (dis-						
mantled).....	1	12,163.00	12,163.00	.....	12,000.00	163.00
Tools and appliances.....		46,668.43	34,123.71	2,441.88	4,666.84	31,898.75
Repair material on hand.....				6,189.14	.....	6,189.14
Total.....		1,082,649.03	814,955.80	54,880.92	66,568.06	803,268.46

¹ Will be dropped by inventory and inspection.

² Sunk; dropped on affidavit.

³ Chartered.

⁴ Borrowed.

3546 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Care of plant.—All the plant employed in these districts was suitably cared for during the year at Memphis, Tenn., at a total expense of \$22,836.37.

Recapitulation.

New plant.....	\$127, 20
Repairs to plant.....	54, 88
Care of plant.....	22, 83
Total.....	204, 92

INCLOSURES.

The following inclosures accompany this report, of which they are parts :
 Plate No. 1. First and second districts.
 Plate No. 2. Hickman, Ky.¹
 Plate No. 3. Slough Landing Neck, New Madrid, Mo.; Point Pleasant Re
 Plate No. 4. Gayoso Bend, Mo.; Caruthersville, Mo.
 Plate No. 5. Barfield, Ark.
 Plate No. 6. Plum Point Reach, chute of Island 26, Daniels Point, Ash
 Bend, Gold Dust, Tenn.; Fletchers Bend, Osceola Front, Ark.; and Bulle
 Bar, Ark.¹
 Plate No. 7. Golden Lake, Ark.¹
 Plate No. 8. Memphis Reach, Hopefield, Memphis Harbor, Tennessee Chu
 Plate No. 9. Star Landing, Miss.; Porter Lake, Ark.
 Plate No. 10. Walnut Bend, Ark.¹
 Plate No. 11. Helena Reach, Trotters Revetment, Helena Revetment.¹
 Plate No. 12. Delta, Miss.
 Plate No. 13. Old Town, Ark.
 Plate No. 14. Sunflower, Miss.
 Plate No. 15. Upper St. Francis levee district.
 Plate No. 16. Reelfoot levee district.
 Plate No. 17. Lower St. Francis levee district No. 1.
 Plate No. 18. Lower St. Francis levee district No. 2.
 Plate No. 19. White River levee district.
 Plate No. 20. Upper Yazoo levee district No. 1.
 Plate No. 21. Upper Yazoo levee district No. 2.
 Plate No. 22. Overflowed areas.

G. P. HOWELL.

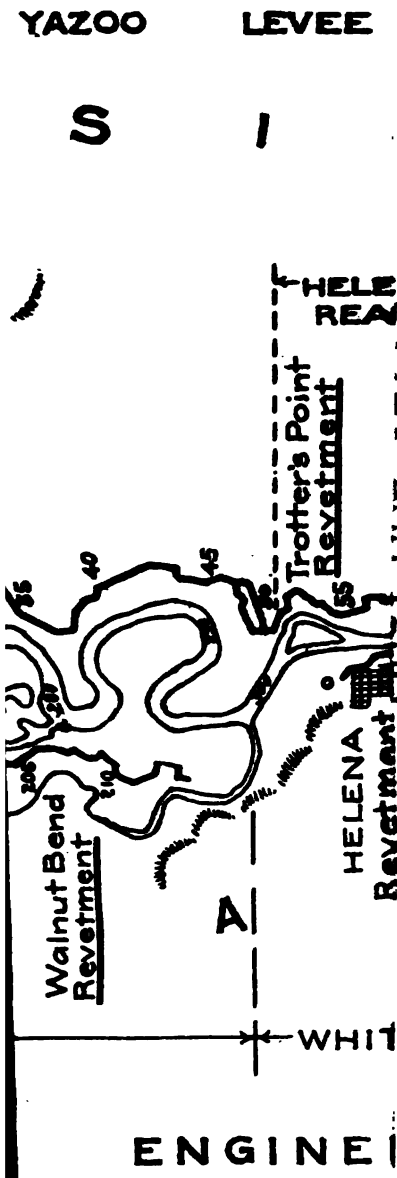
Lieutenant Colonel, Corps of Engineers, United States Army.

Abstract of contracts in force June 30, 1917.

Names of contractors.	Amount and character of work.	Rate per cubic yard.	Date of approval.	Date of beginning work.	Date of completion.
<i>Upper St. Francis levee district.</i>					
R. L. Leonard.....	124,000 cubic yards levee work, stations 20/16-22/0.	Cents. 21.00	1916. Oct. 25	1916. Nov. 9	1916. Dec.
Do.....	200,000 cubic yards levee work, stations 22/0-24/0.	26.95	Oct. 9	Oct. 24	D
Do.....	176,000 cubic yards levee work, stations 24/0-26/15.	21.00	Oct. 25	Nov. 9	D
Oglesby Construction Co.....	170,000 cubic yards levee work, stations 67/45-68/21.	20.00	1915. Sept. 10	Feb. 10	2 D
Do.....	115,000 cubic yards levee work, stations 68/21-69/0.	18.00	do.....	do.....	D
Do.....	140,000 cubic yards levee work, stations 69/0-69/27.	16.00	do.....	do.....	D
Do.....	100,000 cubic yards levee work, stations 69/27-70/0.	13.60	do.....	do.....	D
Do.....	102,000 cubic yards levee work, stations 70/0-70/21.	12.00	do.....	do.....	D

¹ Not printed.

² Work temporarily suspended.



PREPARED UNDER THE DIRECTION OF
 LIEUT. COL. G.P. HOWELL, CORPS OF ENGINEERS, U.S.A.

SCALE OF MILES



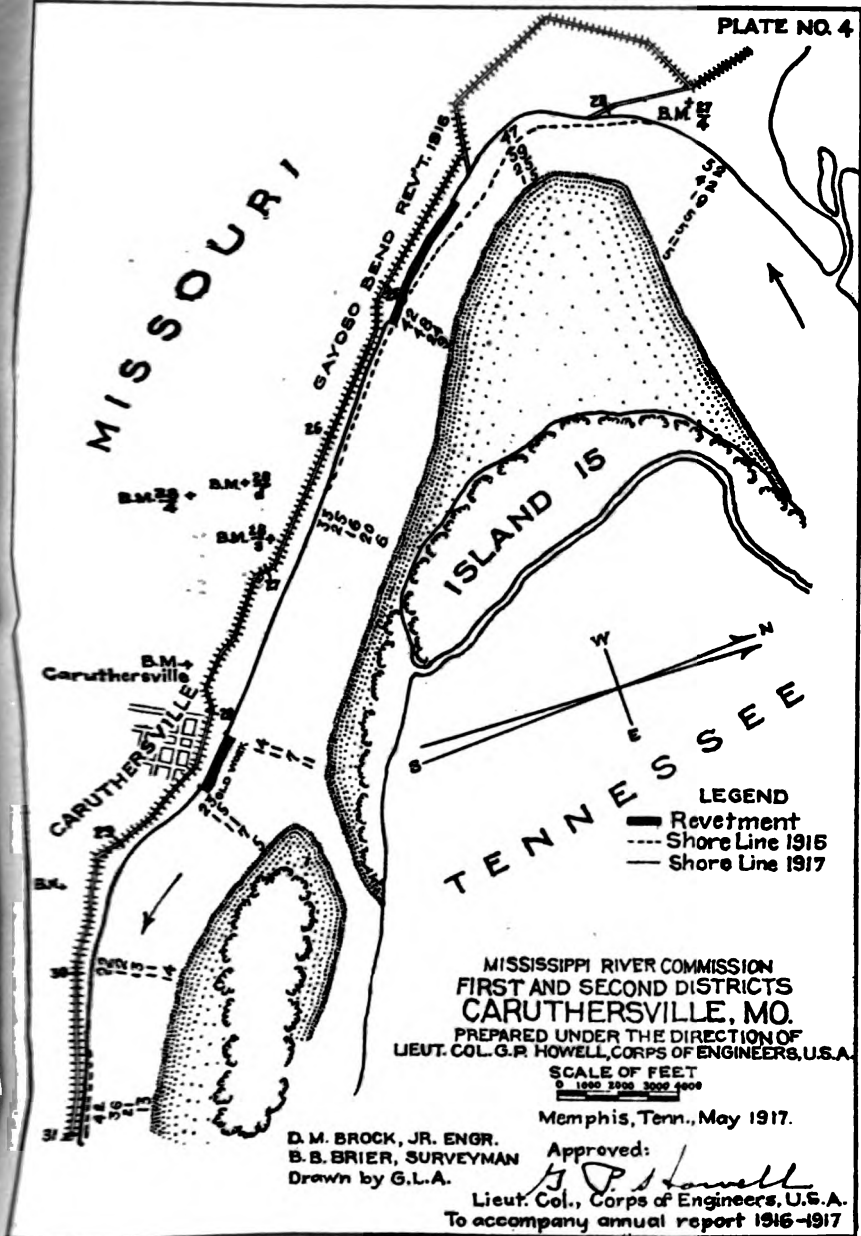
Memphis Tenn. May, 1917.

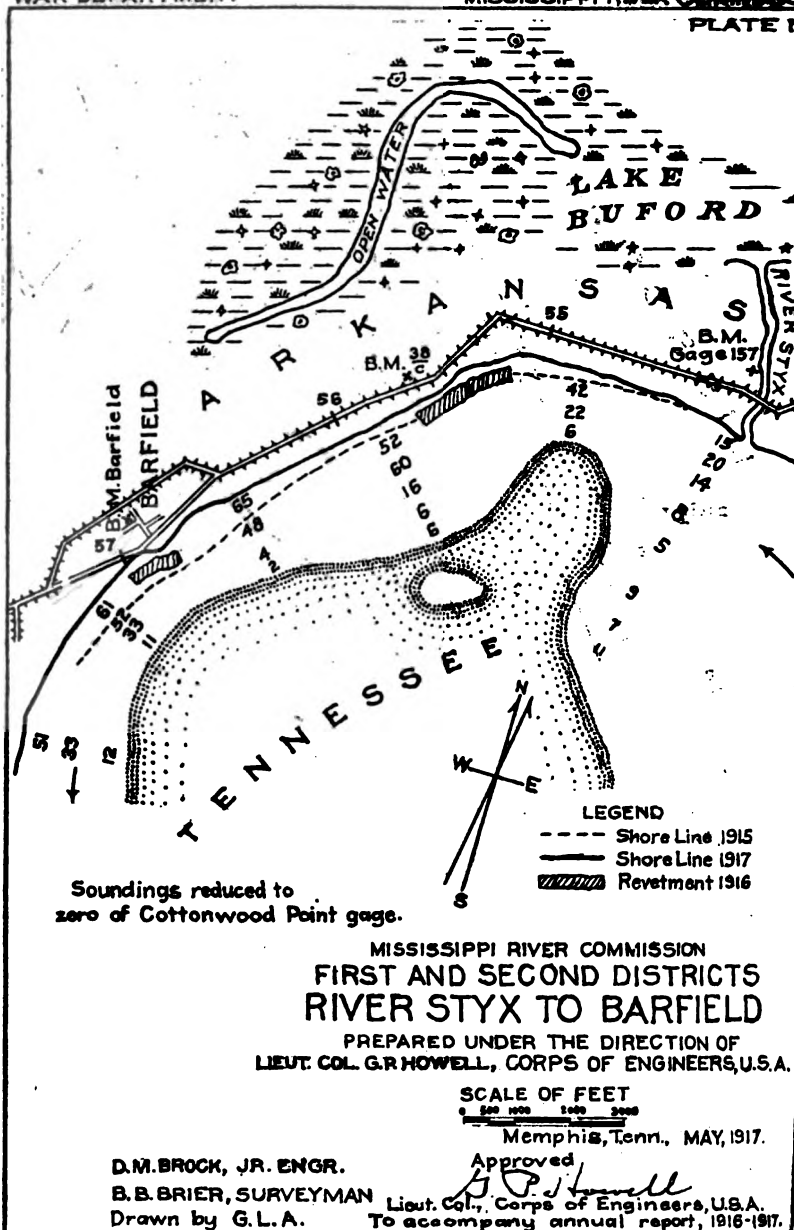
D.M. BROCK, JR. ENGR.
 B.B. BRIER, SURVEYMAN.
 Drawn by G.L.A.

Approved:

G. P. Howell

Lieut. Col., Corps of Engineers, U.S.A.
 To accompany annual report 1916-1917.





A S

47

28 - 1912

27
30
27
25
17
9

LOGAN HATCHIE RIVER
RIVER

LI

D. M. BR

B. B. BR

Drawn I



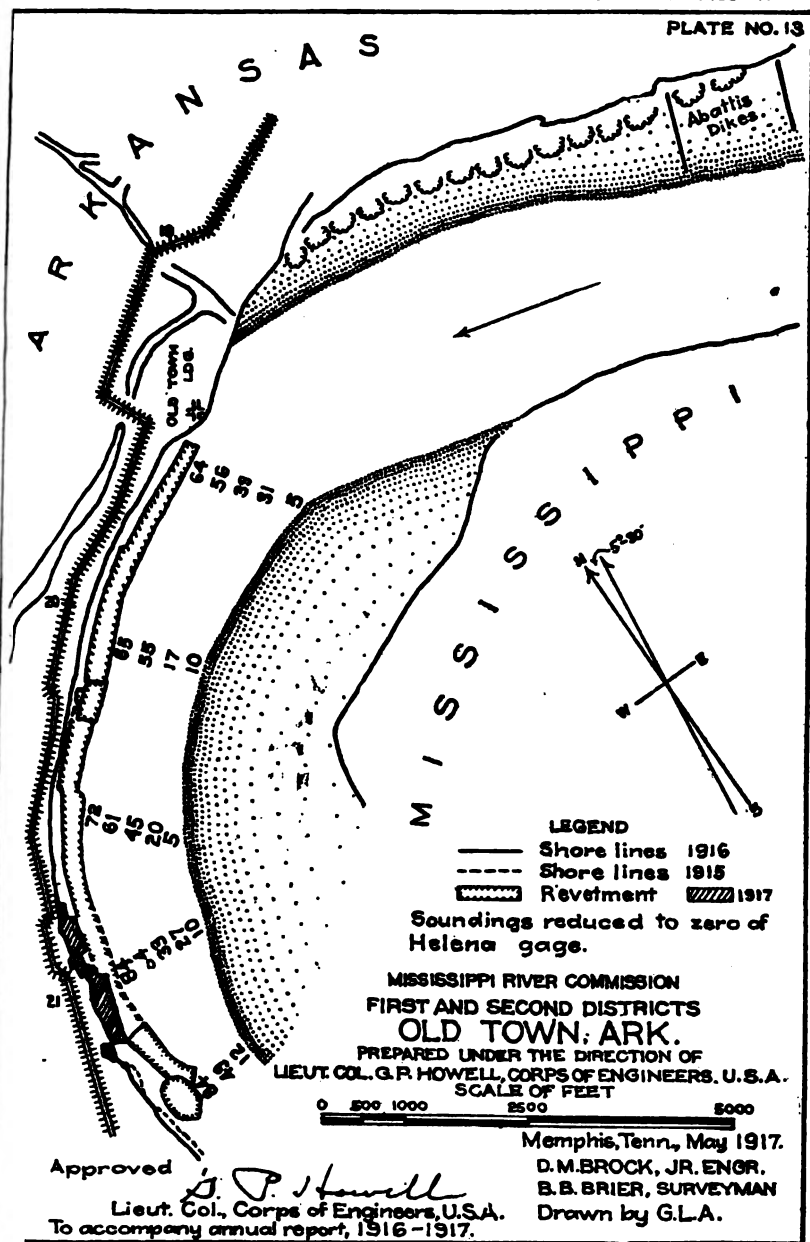
nt
nt lost
lemphig

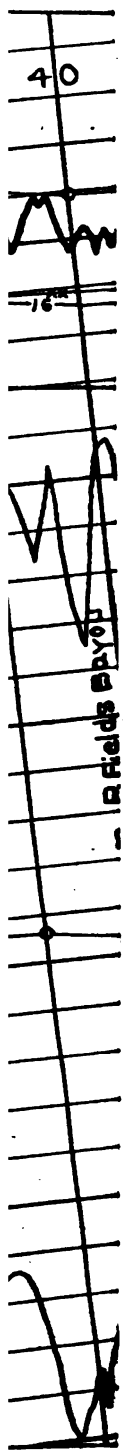


1904

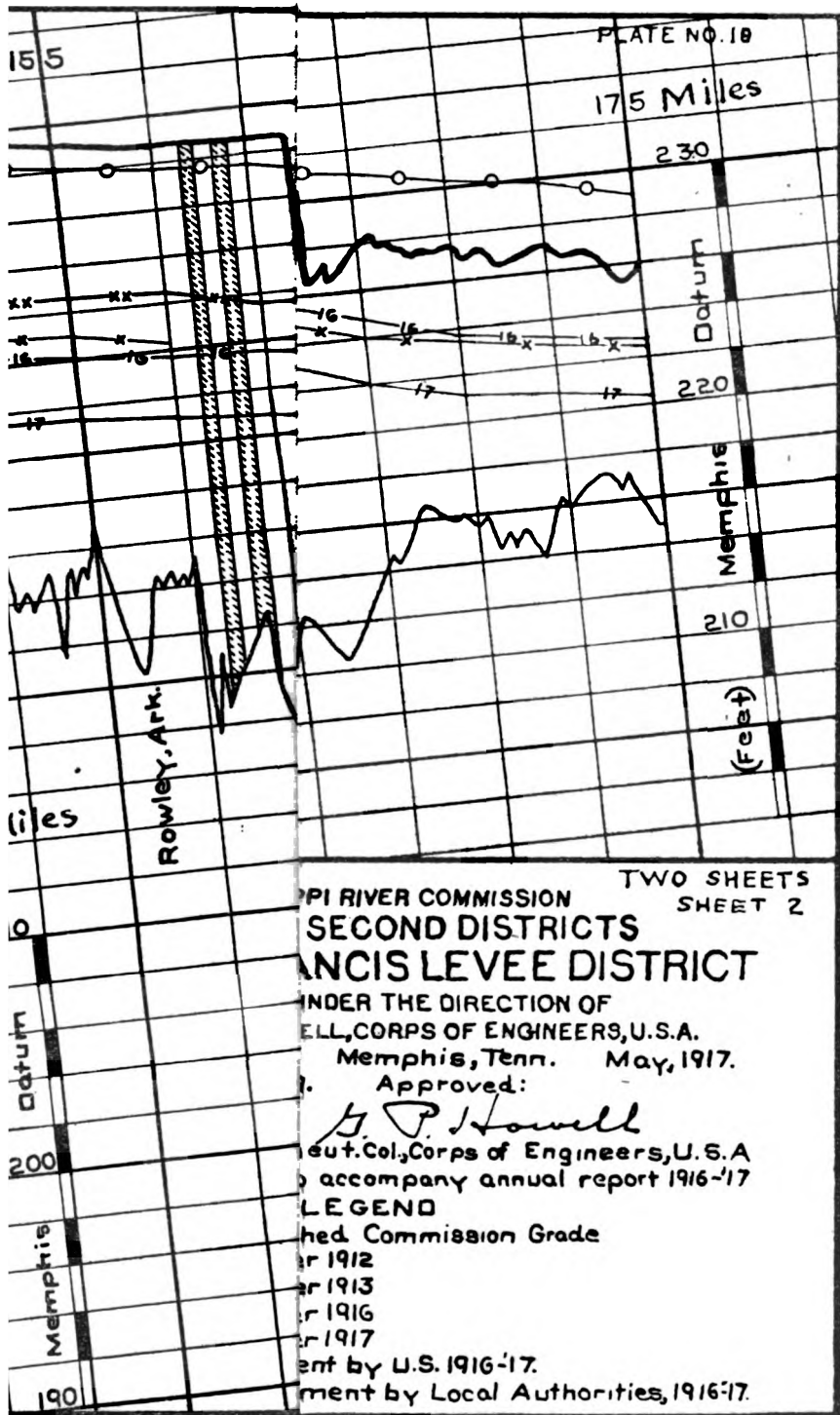


Helena G

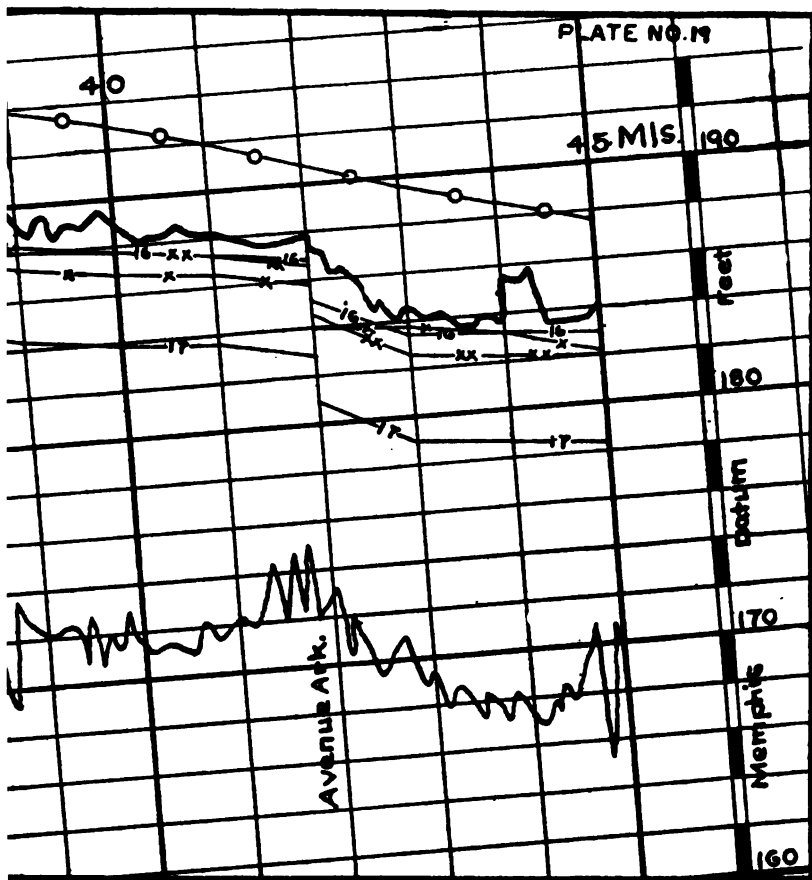




MISSISSIPPI RIVER COMMISSION



MISSISSIPPI RIVER COMMISSION



MISSISSIPPI RIVER COMMISSION
FIRST AND SECOND DISTRICTS
WHITE RIVER LEVEE DISTRICT

PREPARED UNDER THE DIRECTION OF
MAJOR M.J. McDONOUGH, CORPS OF ENGINEERS, U.S.A.

Memphis, Tenn., April, 1917

L.Y. KERR ASST. ENGR.

Approved:

Drawn by F.V.R.

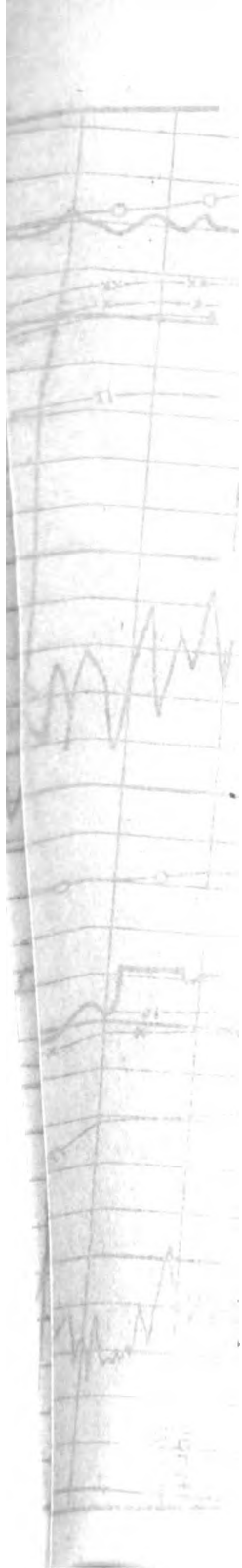
H. P. Howell

Lieut. Col., Corps of Engineers, U.S.A.

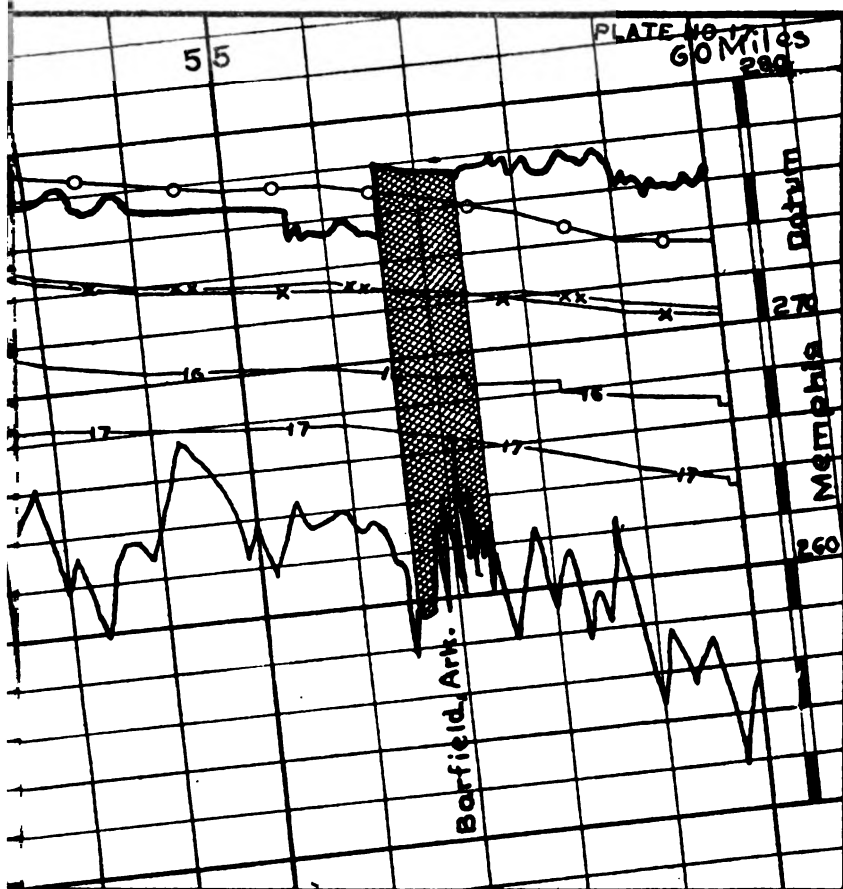
To accompany annual report, 1916-1917

LEGEND

- | | | |
|-----------------|-------|---|
| High Water 1912 | ○ — ○ | Established Commission Grade |
| High Water 1913 | | Built by U.S. 1916-1917 |
| High Water 1916 | | Enlargement by U.S. 1916-1917 |
| High Water 1917 | | Enlargement by Local Authorities 1916/7 |



MISSISSIPPI RIVER COMMISSION



MISSISSIPPI RIVER COMMISSION

TWO SHEETS
SHEET 1

FIRST AND SECOND DISTRICTS
VER ST. FRANCIS LEVEE DISTRICT

PREPARED UNDER THE DIRECTION OF

HEUT. COL. G. P. HOWELL, CORPS OF ENGINEERS, U.S.A.

Memphis, Tenn. May, 1917

ERR ASST. ENGR.

Approved:

yn by F.V.R.

Lieut. Col., Corps of Engineers, U.S.A.

To accompany annual report, 1916-17

LEGEND

- o— Established Commission Grade
- x— High Water 1912
- ix— High Water 1913
- ix— High Water 1916
- ix— High Water 1917
- ix— Built by U.S. 1916-17.
- ix— Built by Local Authorities, 1916-1917
- ix— Enlargement by U.S. 1916-1917.
- ix— Enlargement by Local Authorities, 1916-1917.



MISSISSIPPI RIVER COMMISSION
AND SECOND DISTRICTS
AZOO LEVEE DISTRICT

TWO SHEETS
SHEET 2.

RED UNDER THE DIRECTION OF
HOWELL, CORPS OF ENGINEERS, U.S.A.

Memphis, Tenn. MAY, 1917

ENGR.

Approved:

H. O. Howell
Lieut. Col., Corps of Engineers, U.S.A.
To accompany annual report, 1916-'17

ission Grade

Local Authorities, 1916-'17

PLATE NO. 21

20 Miles

21/35+72

190

(Feet)

180

Datum

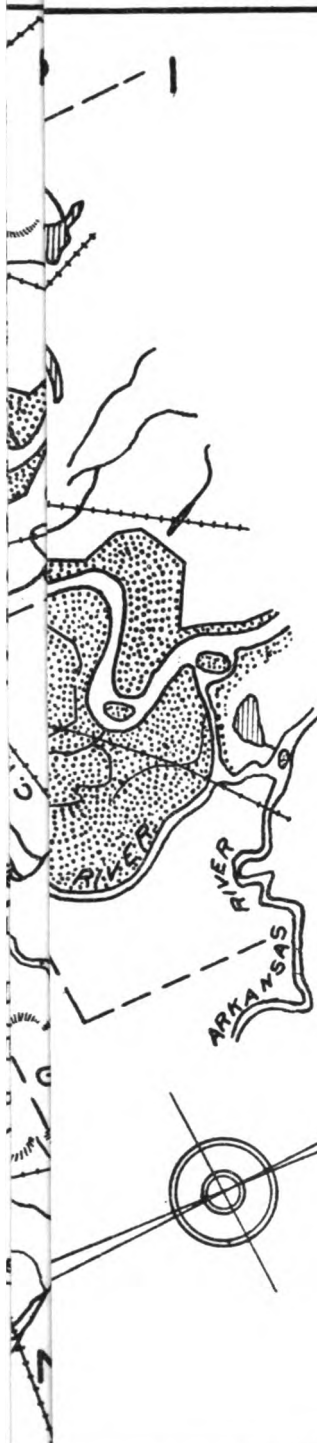
170

Memphis

160

Robinsonville
Ldg. Miss.

Malone Miss.



MISSISSIPPI RIVER COMMISSION

FIRST AND SECOND DISTRICTS OVERFLOWED AREAS, HIGH WATER, APRIL, 1917

PREPARED UNDER THE DIRECTION OF
LIEUT. COL. G. P. HOWELL, CORPS OF ENGINEERS, U. S. A.



Memphis, Tenn. May, 1917.

L. Y. KERR ASST. ENGR.

Drawn by F. V. R.

Levees shown by full heavy lines
Overflowed areas

Approved:-

G. P. Howell

Lieut. Col., Corps of Engineers, U. S. A.
To accompany annual report 1916-1917.

Abstract of contracts in force June 30, 1917—Continued.

Names of contractors.	Amount and character of work.	Rate per cubic yard.	Date of approval.	Date of beginning work.	Date of expiration of contract.
<i>Ogleby Construction Co.—</i>	102,000 cubic yards levee work, stations 70/26-71-0.	<i>Cents.</i> 11.00	1915. Sept. 10	1916. Feb. 10	1917. Dec. 31
<i>Continued.</i>					
Do.....	200,000 cubic yards levee work, stations 71/0-72/0.	10.00	do.....	do.....	Do.
Do.....	158,000 cubic yards levee work, stations 72/0-73/26.	16.56	do.....	do.....	Do.
Do.....	842,000 cubic yards levee work, stations 72/26-76/0.	9.00	do.....	do.....	Do.
<i>Reelfoot levee district.</i>					
Roach, Stansell, Lowrance Bros. & Co.	360,000 cubic yards levee work, stations 2/37-4/36.	16.00	1916. Nov. 4	Nov. 21	Do.
<i>Lower St. Francis levee district.</i>					
Rodgers Bros.....	400,000 cubic yards levee work, stations 48/4-49/49.	18.50	Oct. 11	Oct. 27	Do.
R. L. Leonard.....	200,000 cubic yards levee work, stations 97/20-101/0.	26.00	Oct. 9	Oct. 24	Do.
Tale & Reagan.....	440,000 cubic yards levee work, stations 145/6-146/15.	21.80	1915. July 8	1915. July 25	1916. Dec. 31
Roach, Stansell, Lowrance Bros. & Co.	227,896 cubic yards levee work, stations 146/15-147/8.	17.50	July 14	July 24	¹ , ² Do.
R. L. Leonard.....	277,000 cubic yards levee work, stations 157/19-160/0.	26.00	1916. Oct. 9	1916. Oct. 24	1917. Dec. 31
<i>White River levee district.</i>					
Rodgers Bros.....	260,000 cubic yards levee work, stations 30/26-31/18.	21.30	Oct. 21	Nov. 7	Dec. 31
Do.....	284,000 cubic yards levee work, stations 32/0-34/0.	18.20	1915. July 14	1915. July 27	¹ Dec. 31
Do.....	300,000 cubic yards levee work, stations 34/0-36/0.	18.20	do.....	do.....	¹ , ² Do.
Do.....	160,000 cubic yards levee work, stations 36/0-37/0.	26.70	1916. Oct. 21	1916. Nov. 8	1917. Dec. 31
<i>Leases, stone, etc.</i>					
G. W. Fisher.....	Rent of river front at Memphis, Tenn.	³ \$50	Lease.	July 1	1917. June 30
Charles H. Boyle.....	do.....	³ 50.00	do.....	do.....	Do.
Mrs. Jennie Astor and husband, W. B. Astor.	Rent of land near Government fleet.	³ 100.00	do.....	do.....	Do.
St. Louis-San Francisco Ry. Co.	do.....	³ 125.00	do.....	do.....	Do.
Tennessee Contracting Co.....	Furnishing brush and poles, 100,000 cords.	⁴ 1.75	1916. Oct. 11	Oct. 17	(?)
Arnold Stone Co.....	Furnishing 12,000 cubic yards riprap stone.	⁵ 1.00	1917. Mar. 30	1917. Apr. 26	1917. Aug. 23
Ward & Brown.....	Furnishing 25,000 tons riprap stone.	⁶ .49	Apr. 19	May 10	July 31

¹ Work temporarily suspended.² Time limit waived.³ Per annum.⁴ Per cord.⁵ Per cubic yard.⁶ Per ton.⁷ Indefinite.

FINANCIAL STATEMENT, FIRST AND SECOND MISSISSIPPI RIVER DISTRICTS.

Appropriation for Mississippi River.

SURVEYS.

Amount allotted from river and harbor act, July 27, 1916.....	\$5,000. 00
Amount received from sale of United States property (contact prints)	4. 32
	<hr/>
June 30, 1917, amount expended during fiscal year.....	5,004. 32
	<hr/>
	5,004. 32

UPPER ST. FRANCIS LEVEE DISTRICT.

Amount allotted from river and harbor act, July 27, 1916.....	100,000. 00
July 1, 1917, balance unexpended.....	100,000. 00
July 1, 1917, outstanding liabilities.....	\$1,000. 00
July 1, 1917, amount covered by uncompleted contracts.....	95,500. 00
	<hr/>
	98,500. 00
	<hr/>
July 1, 1917, balance available.....	3,500. 00

LOWER ST. FRANCIS LEVEE DISTRICT.

Amount allotted from river and harbor act, July 27, 1916.....	270,000. 00
June 30, 1917, amount expended during fiscal year.....	35,367. 48
	<hr/>
July 1, 1917, balance unexpended.....	234,632. 52
July 1, 1917, outstanding liabilities.....	\$1,200. 00
July 1, 1917, amount covered by uncompleted contracts.....	189,200. 00
	<hr/>
	190,400. 00
	<hr/>
July 1, 1917, balance available.....	44,232. 52

WHITE RIVER LEVEE DISTRICT.

Amount allotted from river and harbor act, July 27, 1916.....	100,000. 00
July 1, 1917, balance unexpended.....	100,000. 00
July 1, 1917, outstanding liabilities.....	\$600. 00
July 1, 1917, amount covered by uncompleted contracts.....	79,400. 00
	<hr/>
	80,000. 00
	<hr/>
July 1, 1917, balance available	20,000. 00

REELFoot LEVEE DISTRICT.

Amount allotted from river and harbor act, July 27, 1916.....	40,000. 00
June 30, 1917, amount expended during fiscal year.....	8,029. 66
	<hr/>
July 1, 1917, balance unexpended.....	31,970. 34
July 1, 1917, outstanding liabilities.....	\$200. 00
July 1, 1917, amount covered by uncompleted contracts.....	22,000. 00
	<hr/>
	22,200. 00
	<hr/>
July 1, 1917, balance available.....	9,770. 34

GAYOSO BEND, MO.

Amount allotted from river and harbor act, July 27, 1916.....	150,000. 00
June 30, 1917, amount expended during fiscal year.....	56,778. 56
	<hr/>
July 1, 1917, balance unexpended.....	93,221. 44
July 1, 1917, outstanding liabilities.....	\$20,500. 00
July 1, 1917, amount covered by uncompleted contracts.....	31,900. 00
	<hr/>
	52,400. 00
	<hr/>
July 1, 1917, balance available.....	40,821. 44

BARFIELD, ARK.

Amount allotted from river and harbor act, July 27, 1916	\$200,000.00
June 30, 1917, amount expended during fiscal year	149,730.03
July 1, 1917, balance unexpended	50,269.97
July 1, 1917, outstanding liabilities	\$10,500.00
July 1, 1917, amount covered by uncompleted contracts	20,500.00
	31,000.00
July 1, 1917, balance available	19,269.97

BULLERTON BAR, ARK.

Amount allotted from river and harbor act, July 27, 1916	150,000.00
June 30, 1917, amount expended during fiscal year	65,242.68
July 1, 1917, balance unexpended	84,757.32
July 1, 1917, outstanding liabilities	\$1,800.00
July 1, 1917, amount covered by uncompleted contracts	2,000.00
	3,800.00
July 1, 1917, balance available	80,957.32

WOLF RIVER.

July 1, 1916, balance unexpended	192.79
June 30, 1917, amount expended during fiscal year	192.79

MEMPHIS HARBOR.

Amount allotted from river and harbor act, July 27, 1916	26,000.00
June 30, 1917, amount expended during fiscal year	21,107.77
July 1, 1917, balance unexpended	4,892.23
July 1, 1917, outstanding liabilities	4,892.23

POETER LAKE, ARK.

Amount allotted from river and harbor act, July 27, 1916	105,000.00
June 30, 1917, amount expended during fiscal year	34,453.66
July 1, 1917, balance unexpended	70,546.34
July 1, 1917, outstanding liabilities	\$9,800.00
July 1, 1917, amount covered by uncompleted contracts	37,800.00
	47,600.00
July 1, 1917, balance available	22,946.34

HELENA, ARK.

July 1, 1916, balance unexpended	31,320.75
June 30, 1917, amount expended during fiscal year	1,150.33
July 1, 1917, balance unexpended and available	30,170.42

OLD TOWN BEND, ARK.

Amount allotted from river and harbor act, July 27, 1916	105,000.00
June 30, 1917, amount expended during fiscal year	78,177.68
July 1, 1917, balance unexpended	26,822.32
July 1, 1917, outstanding liabilities	\$9,400.00
July 1, 1917, amount covered by uncompleted contracts	14,400.00
	23,800.00
July 1, 1917, balance available	3,022.32

3550 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

GENERAL REPAIRS AND STONE.

Amount allotted from river and harbor act, July 27, 1916-----	\$50,000. 00
June 30, 1917, amount expended during fiscal year for account works, as follows:	
Star Landing, Miss-----	\$609. 26
Stone-----	3, 419. 24
	<hr/> 4, 028. 50
July 1, 1917, balance unexpended-----	45, 971. 50
July 1, 1917, outstanding liabilities-----	\$2, 100. 00
July 1, 1917, amount covered by uncompleted contracts--	21, 850. 00
	<hr/> 23, 450. 00
July 1, 1917, balance available-----	22, 521. 50

PLANT.

Amounted allotted from river and harbor act, July 27, 1916-----	75,000. 00
Amount received from sale of condemned United States property--	380. 50
	<hr/> 75, 880. 50
June 30, 1917, amount expended during fiscal year-----	49, 036. 31
	<hr/> 26, 844. 19
July 1, 1917, balance unexpended-----	26, 844. 19
July 1, 1917, outstanding liabilities-----	5, 600. 00
	<hr/> 20, 744. 19
July 1, 1917, balance available-----	20, 744. 19

NEW PLANT.

July 1, 1916, balance unexpended-----	2, 133. 33
Amount allotted from river and harbor act, July 27, 1916-----	297, 000. 00
	<hr/> 299, 133. 33
June 30, 1917, amount expended during fiscal year-----	117, 841. 42
	<hr/> 181, 791. 91
July 1, 1917, balance unexpended-----	181, 791. 91
July 1, 1917, outstanding liabilities-----	46, 000. 00
	<hr/> 135, 791. 91
July 1, 1917, balance available-----	135, 791. 91

Appropriation for maintenance and improvement of existing river and harbor works, act Oct. 2, 1914.

UPPER ST. FRANCIS LEVEE DISTRICT.

July 1, 1916, balance unexpended-----	\$1, 485. 20
June 30, 1917, amount expended during fiscal year-----	1, 485. 20

WATSON POINT DIKE, AT SLOUGH LANDING NECK.

July 1, 1916, balance unexpended-----	473. 14
June 30, 1917, amount expended during fiscal year-----	30. 20
	<hr/> 442. 94
July 1, 1917, balance unexpended and available-----	442. 94

STAR LANDING, MISS.

July 1, 1916, balance unexpended-----	20, 125. 29
June 30, 1917, amount expended during fiscal year-----	20, 125. 29

GENERAL REPAIRS AND STONE.

July 1, 1916, balance unexpended-----	10, 610. 01
June 30, 1917, amount expended during fiscal year for account works, as follows:	
Star Landing, Miss-----	\$1, 724. 54
Trotters Point, Miss-----	2. 23
Sunflower, Miss-----	8. 05
Plant (repairs)-----	8, 875. 19
	<hr/> 10, 610. 01

Appropriation for maintenance and improvement of existing river and harbor works, act Mar. 4, 1915.

UPPER ST. FRANCIS LEVEE DISTRICT.

July 1, 1916, balance unexpended.....	\$50,674.86
June 30, 1917, amount expended during fiscal year.....	27,664.35

July 1, 1917, balance unexpended.....	23,010.51
July 1, 1917, amount covered by uncompleted contracts.....	23,010.51

LOWER ST. FRANCIS LEVEE DISTRICT.

July 1, 1916, balance unexpended.....	\$162,333.55
June 30, 1917, amount expended during fiscal year.....	162,333.55

WHITE RIVER LEVEE DISTRICT.

July 1, 1916, balance unexpended.....	\$133,809.49
Amount received from sale of United States property (contract prints).....	.45

	133,809.94
June 30, 1917, amount expended during fiscal year.....	110,567.73

July 1, 1917, balance unexpended.....	23,242.21
July 1, 1917, amount covered by uncompleted contracts.....	23,242.21

SLOUGH LANDING NECK, TENN.

July 1, 1916, balance unexpended.....	41,790.20
June 30, 1917, amount expended during fiscal year.....	33,031.95

July 1, 1917, balance unexpended.....	8,758.25
July 1, 1917, outstanding liabilities.....	200.00

July 1, 1917, balance available.....	8,558.25
--------------------------------------	----------

PLUM POINT REACH.

July 1, 1916, balance unexpended.....	55,521.81
June 30, 1917, amount expended during fiscal year.....	55,521.81

MEMPHIS HARBOR.

Amount received by transfer from Delta, Miss.....	25,000.00
---	-----------

July 1, 1917, balance unexpended.....	25,000.00
July 1, 1917, outstanding liabilities.....	6,500.00

July 1, 1917, balance available.....	18,500.00
--------------------------------------	-----------

¹ Balance reported as unexpended at end of last fiscal year, viz, \$50,254.86, increased \$420, due to reimbursement received in July, 1916, from Little River drainage district, Cape Girardeau, Mo., for inspection expenses incurred and disbursed for account of district prior to July 1, 1916.

² Balance reported as unexpended at end of last fiscal year, viz, \$162,333.55, increased 20 cents, due to refundment of overpayment on voucher in accounts in fiscal year 1916.

³ Balance reported as unexpended at end of last fiscal year, viz, \$133,809.04, increased 45 cents, due to refundment of overpayment on voucher in accounts in fiscal year 1916.

3552 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

DELTA, MISS.

July 1, 1916, balance unexpended.....	\$133,445.59 ¹
Less transfers during fiscal year, as follows:	
To new plant.....	\$15,000.00
To Memphis Harbor.....	25,000.00
	<hr/> 40,000.00
June 30, 1917, amount expended during fiscal year.....	<hr/> 93,445.59
July 1, 1917, balance unexpended.....	10,409.88
July 1, 1917, outstanding liabilities.....	200.00
July 1, 1917, balance available.....	<hr/> 10,209.88

GENERAL REPAIRS AND STONE.

July 1, 1916, balance unexpended.....	50,000.00
June 30, 1917, amount expended during fiscal year for account works, as follows:	
Slough Landing Neck, Tenn.....	\$535.30
Barfield, Ark.....	1,545.98
Plum Point Reach.....	20,041.39
Hopefield Bend, Ark.....	7,296.03
Star Landing, Miss.....	8,855.62
Sunflower, Miss.....	172.50
Plant (repairs).....	9,979.81
Stone.....	1,573.37
	<hr/> 50,000.00

EXPERIMENTAL REVETMENT.

July 1, 1916, balance unexpended.....	2,986.25
June 30, 1917, amount expended during fiscal year.....	<hr/> 156.98
July 1, 1917, balance unexpended.....	2,829.27
July 1, 1917, outstanding liabilities.....	2,829.27

PLANT.

July 1, 1916, balance unexpended.....	8,940.79 ²
June 30, 1917, amount expended during fiscal year.....	<hr/> 8,940.79

NEW PLANT.

July 1, 1916, balance unexpended.....	14,025.13
Amount received by transfer from Delta, Miss.....	<hr/> 15,000.00
	29,025.13
June 30, 1917, amount expended during fiscal year.....	<hr/> 14,025.13
July 1, 1917, balance unexpended.....	15,000.00
July 1, 1917, outstanding liabilities.....	15,000.00

¹ Balance reported as unexpended at end of last fiscal year, viz, \$133,445.19, increased 40 cents, due to refundment of overpayments on vouchers in accounts in fiscal year 1916.

² Balance reported as unexpended at end of fiscal year, viz, \$8,927.08, increased \$13.71, due to causes as follows:

Reimbursement from appropriation for Panama Canal for inspection expenses incurred and paid for Panama Canal in fiscal year 1916.....	\$18.47
Refundment of overpayment on voucher in accounts in fiscal year 1916.....	24

18.71

Funds contributed for improvement of Mississippi River in Upper St. Francis levee district.

SPECIAL FUNDS.

July 1, 1916, balance unexpended (contributed for expenditure in the Upper St. Francis levee district by the St. Johns levee and drainage district, New Madrid, Mo)-----	\$200,000.00
Amount contributed for expenditure in the Upper St. Francis levee district by the Mississippi County Levee Board No. 1, of Missouri, Charleston, Mo-----	34,000.00
	<hr/> 234,000.00
June 30, 1917, amount expended during fiscal year-----	26,784.69
July 1, 1917, balance unexpended-----	207,265.31
July 1, 1917, amount covered by uncompleted contracts-----	207,265.31

Funds contributed for improvement of Mississippi River in the Reelfoot levee district, Kentucky.

SPECIAL FUND.

Amount contributed for expenditure by the Fulton County Levee Board, Hickman, Ky-----	\$25,000.00
June 30, 1917, amount expended during fiscal year-----	25,000.00

Funds contributed for improvement of Mississippi River at Gayoso Bend, Mo.

SPECIAL FUND.

Amount contributed for expenditure by the St. Francis Levee Board of Missouri, Caruthersville, Mo-----	\$150,000.00
June 30, 1917, amount expended during fiscal year-----	150,000.00

APPENDIX 3.

IMPROVING MISSISSIPPI RIVER, THIRD DISTRICT.

This district extends from White River, Ark., to Warrenton, Miss., a distance of 214 miles by river.

District headquarters: Vicksburg, Miss.

District officer: Maj. J. R. Slattery, Corps of Engineers.

WORKS.

I. Channel work:

- (a) Lake Bolivar Front, Miss.
- (b) Ashbrook Neck, Miss.
- (c) Panther Forest, Ark.
- (d) Leland Neck, Ark.
- (e) Greenville, Miss.
- (f) Vaucluse, Ark.
- (g) Longwood, Miss.
- (h) Grand Lake, Ark.
- (i) Lake Providence Reach.
- (j) Fitlers Bend, Miss.
- (k) Cottonwood, Miss.
- (l) Albemarle Bend, Miss.
- (m) Delta Point, La.
- (n) Mouth of Yazoo River and Harbor of Vicksburg, Miss.
- (o) Vicksburg revetment.
- (p) Reid-Bedford Bend, La.
- (q) Cummins, Ark.
- (r) Red Fork, Ark.

II. Levees:

- (a) Upper Teusas levee district.
- (b) Lower Yazoo levee district.

III. Surveys:

- (a) Revetment.
- (b) Reach and bank line.

IV. Plant.

V. High-water work

I. CHANNEL WORK.

(a) *Lake Bolivar Front, Miss.*

Location.—Four hundred and seventeen miles below Cairo, left bank.

Original condition.—Caving appears to have become active on this point about 1887, and by the latter part of 1888 it became evident that unless the bank was revetted the levee across the head of Lake Bolivar would be destroyed. The destruction of this levee would have necessitated building a long and expensive loop back of the lake.

Previous projects.—None.

Present project.—The present project was adopted by the river and harbor act approved August 11, 1888, and provides for a revetment to correct, permanently locate, and deepen the channel of the river and to protect its bank against caving and thus save a levee situated between the head of Lake Bolivar and the river, the destruction of which would have resulted in the abandonment of a large area of valuable land and would have necessitated the construction of a long and expensive loop back of Lake Bolivar.

Operations and results prior to the present year.—Work was commenced November 1, 1888, and by the latter part of January, 1889, 4,250 feet of bank was revetted with woven willow subaqueous mats and brush and riprap upper-bank pavement. From 1889 to 1906 only minor repairs were made to this work, but by this time the original mats had failed to such an extent that 2,134 feet of fascine mat work was placed, replacing woven mats that had failed and extending the revetment 205 feet downstream. During 1907, 1908, 1909, and 1910 the balance of the original woven mats failed and were replaced with fascine mats. In 1912 the revetment was extended 2,000 feet downstream by subaqueous fascine mats and riprap upper-bank paving. In 1913, 1914, and 1915 only minor repairs were necessary. In 1915-16 the revetment was extended 1,940 feet downstream, and minor repairs were made. As a result of this work the bank at this point has been successfully held, and the necessity of building a new levee avoided. The expenditures prior to the present year have been \$264,640.31 for original work and extensions and \$179,576.12 for repairs and renewals, a total of \$444,216.43.

Operations and results during the present year.—Work on a downstream extension was commenced August 7, 1916, and continued as long as labor could be obtained. One channel mat and four connecting mats, with an aggregate area of 3,161 squares, and length of 1,100 feet, and 760 squares of concrete and 375 squares of stone paving were laid, thus extending the revetment 1,050 feet downstream. The location of the work is shown on plate 3 accompanying. The total expenditures (not including prorated amount of cost of care, depreciation, and maintenance of plant) were \$36,693.75, of which amount \$31,581.69 was for new work and \$5,112.06 for maintenance. Detailed cost data is given in the following table:

LAKE BOLIVAR REVETMENT (417 L.), THIRD DISTRICT.

Matresses, total area 3,161 squares (channel, 85 per cent; connecting, 15 per cent).¹

BUILDING MATERIAL.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization ²		\$111.09		\$0.035
1/2-inch strand ³ pounds..	20,201	1,454.47	6.39	.460
3/4-inch strand ³ do.....	11,296	646.03	3.57	.204
1-inch strand ³ do.....	32,821	2,067.73	10.38	.654
Spikes ⁴ do.....	700	217.00	.22	.069
Staples ⁵ do.....	800	29.60	.26	.009
Clips, 1/2-inch ⁶ number..	130	12.35	.04	.004
Clips, 3/4-inch ⁶ do.....	130	14.30	.04	.005
Brush and poles ⁷ cords..	4,972	5,631.18	1.57	1.750
Rope, manila ⁸ pounds..	3,684	660.12	1.17	.218
Coal ⁹ tons.....	2.4	7.20		.002
Miscellaneous expenses ⁵		581.78		.184
Subsistence ⁶		1,288.00		.407
Steamboat expenses ⁷		206.95		.065
Labor ⁸		2,642.43		.836
Supervision ⁹		616.16		.195
Total.....		16,186.39		5.097

BALLASTING AND SINKING.

Stone ¹ tons..	2,506	\$5,017.76	0.79	\$1.587
Rope, manila ² pounds..	3,684	660.12	1.17	.209
Miscellaneous expenses ³		280.89		.092
Subsistence ⁴		287.50		.091
Labor ⁵		631.12		.200
Supervision ⁶		121.25		.038
Total.....		7,008.64		2.217

Grading.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Coal ¹ tons..		\$196.02		\$0.173
Oil ²		25.00		.022
Subsistence ³		173.00		.152
Steamboat expenses ⁴		107.55		.090
Labor ⁵		620.32		.546
Total.....		1,121.89		.983

See page 3556 for footnotes.

Paving.

		Quantity used.		Per square.	
		Total quantity.	Total cost.	Quantity.	Cost.
Stone ¹	tons	1,959	\$3,922.11	5.25	\$10.460
Cement ²	sacks	3,114	1,289.69	4.10	1.672
Sand and gravel ³	cubic yards	980	759.65	1.26	1.00
Coal ⁴	tons	169	507.96	.15	.448
Miscellaneous expenses ⁵			200.89		.256
Subsistence ⁶			1,089.10		.980
Steamboat expenses ⁷			206.95		.182
Labor ⁸			2,039.21		1.80
Supervision ⁹			494.91		.436
Total.....			10,580.47		17.214
Total field cost ¹⁰			* 34,897.39		

* Includes repairs amounting to \$5,112.06.

Summary of costs (linear feet revetted, 1,050).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square.	Total.		
Total field cost.....	\$7.34	\$23,195.03	\$10.31	\$11,702.36	\$34,897.39	\$30.08
Office expenses.....					1,599.36	
Surveys ¹¹					197.00	
Care of plant ¹²					745.11	
Repair of plant.....					2,279.78	
Depreciation of plant ¹³					2,344.39	
Total.....					41,996.03	35.12

¹ Includes areas of mats built, not areas of ground covered.² Includes in each case the cost of assembling and moving plant and material, either from winter quarters, or a previous job, to the particular job to which the item applies, and this particular job's pro rata of the cost of laying up the plant at the end of the season.³ The reported cost of the material is the cost delivered on the job.⁴ These items include only the coal and oil used on the graders, upper bank-paving machinery, and sand pumps. The coal used on tenders and towboats will not be included under this heading.⁵ This includes all tools, expendable material, and other articles which are not regarded as replacement of plant, and are not otherwise itemized. Articles such as ranges, furniture, and furnishings for boats and quarter boats, instruments, typewriters, and all articles used to replace plant or equipment, are to be charged to plant.⁶ This item is the cost of the served ration.⁷ This item includes all the expenses of operating the tenders and no others, and excludes all expenses of boats in general towing service, and inspection and survey boats.⁸ Includes wages of all employed on the work, except those specified in 9.⁹ Includes salaries of superintendents, junior engineers, overseers, foremen, timekeepers, and inspectors.¹⁰ In adding total field cost, omit totals under headings "Per square."¹¹ This item includes actual cost of survey work done on this revetment.¹² Includes all costs of looking after and caring for plant when same is out of commission, but does not include the cost of caring for plant when it is temporarily laid up during the working season on account of inclement weather conditions or unfavorable river stages.¹³ Depreciation is to be taken at 6 per cent of first cost per annum for all plant with untreated wood hulls; 5 per cent for all plant with treated (creosoted) wooden hulls, and 4 per cent for all plant with steel hulls.

In distributing plant charges among the various works, there is charged to levees an amount sufficient to represent a fair charge for the service rendered levee work by floating plant.

Conditions at end of year.—The revetment is in good condition, except for one minor break in upper bank work, which occurred too late in the season to be repaired. Caving below the revetment is only normal. The effective length of the revetment is 8,640 feet.

Local cooperation.—None.

Proposed operations.—It is proposed to make the necessary repairs to maintain the work in good condition.

Effect of improvement.—The bank along this front has been held, the levee has been saved, a large area of land has been protected, and the channel has been permanently located.

(b) *Ashbrook Neck, Miss.*

Location.—Four hundred and forty-six miles below Cairo, left bank.

Original condition.—In 1870 the width of this point at the narrowest place was approximately 4,800 feet. By 1890, caving along the upper side of the point had reduced the width of the neck to 2,800 feet. As there was no reason to expect the caving to stop from natural causes, a cut-off across this neck seemed imminent unless steps were taken to prevent it. A cut-off would have upset the regimen of the river in this locality and would have resulted in the loss of many miles of levee, the destruction of a large area of cultivated land, and bad channel conditions before the river could again adjust its slope.

Previous projects.—None.

Present project.—While the original project, adopted in 1890, provided for the prevention of a cut-off by the construction of a series of spur dikes on the upper side of the neck to check erosion and the retardation of the flow across the neck by slashings, it was modified during construction to provide continuous revetment in lieu of spur dikes and a levee about 7,000 feet long in lieu of the slashings. The project was further modified in 1915, requiring the construction of an earthen dike or levee to commission grade, about 26,000 feet long, extending from the main levee line to or near the high ground at the west end of Ashbrook Point.

Operations and results prior to the present year.—Two spur dikes were partially built; two slashings were made across the neck to cause deposit, and a levee of light section constructed, and 11,150 feet of bank was protected by continuous revetment. In the continuous bank work about 4,000 feet of woven willow mattress was placed, practically all of which had to be subsequently reinforced with fascine mattress. In 1906 about 400 feet of mat was lost as a result of flanking at the ends. The spur dikes, slashings, and bundles failed to produce deposits and the levee was damaged during the floods of 1892 and 1893, and overtopped and destroyed in 1897. The continuous revetment has, however, prevented a cut-off. Two Bucyrus drag-line levee machines were ordered for the construction of the earthen spur dike authorized in 1915. The cost of the work prior to the present fiscal year amounted to \$490,066.31 for original work and extensions and \$320,704 for maintenance, a total of \$810,770.31.

Operations and results during the present year.—Delays in completing more urgent work at other points on account of shortage of rock and labor prevented undertaking actual revetment work at this point during the year. Only minor repairs were made. The total expenditures (not including prorated cost of care, depreciation, and maintenance of plant) amounted to \$1,973.37, all of which was for maintenance.

Operations and results during the present year.—On August 10 contract was entered into with the Warrior Timber & Contracting Co. for clearing the right of way and grubbing the foundation for the dike. On September 15 the first drag-line excavator was landed on the work, and on September 29, 1916, the second. Work was prosecuted until January 27, when approaching high water made it necessary to shut down and secure the ends of the work. The dike was completed from its outer end for a distance of 14,000 feet, 422,670 cubic yards of material having been placed in it at a unit cost of 6.3 cents per cubic yard. The outer end was protected with paving, 378 squares of concrete having been placed at a cost of \$6,007.08 and 130 squares of stone at a cost of \$1,404.17. The upper end was protected with a brush mat weighted down with rock, 162 squares having been laid at a cost of \$2,049.66. During the high water considerable work was necessary to protect the dike from destruction by the current along the lower end. Expenditures for this work amounted to \$8,373.55. Total expenditures on the dike during the year (exclusive of cost of machines and surveys) amounted to \$44,673.37, of which \$34,250.16 was for new work and \$10,423.21 was for maintenance during the high water.

Condition at end of the year.—There is in place 11,150 feet of effective bank protection in good condition and 14,000 feet of earthen dike in good condition except at the outer end. As caving continues below the lower end of the revetment an extension is necessary to prevent the neck from getting any narrower and to prevent the flanking of the work already in place.

Local cooperation.—None.

Proposed operations.—It is proposed to extend the revetment about 3,000 feet downstream and to complete the spur levee, 26,300 feet in length, authorized May 22, 1915.

Effect of improvement.—The work accomplished has prevented a cut-off and permanently fixed the channel.

(c) *Panther Forest, Ark.*

Location.—Four hundred and fifty-two miles below Cairo, right bank.

Original condition.—Caving has been in progress since the earliest surveys—1879 and 1880. In 1908 the controlling levee line was threatened at a point where relocation would have been expensive on account of having to cross an old river bed.

Previous projects.—None.

Present project.—To protect the large and important levee line at this locality and to permanently locate the channel.

Operations and results prior to the present year.—Work was commenced in 1908; 2,000 feet of bank was revetted with subaqueous fascine willow mats and riprap upper bank paving. The work was extended down stream 2,150 feet in 1911. As a result of the 1912 and 1913 high waters about 800 linear feet of the work at the upper end was practically destroyed. The damages were repaired in 1914 and the work extended upstream 1,050 feet, but the upper bank work was seriously damaged again during the following high water. These damages were repaired in the fiscal year 1915. In 1916 incomplete repair work left over from the preceding season was finished and the revetment was extended 420 feet upstream. The revetment has been successful in saving the construction of a new levee. The total expenditures prior to the present fiscal year have been \$205,836.20 for original work and extensions and \$190,081.98 for repairs and renewals, a total of \$395,918.18.

Operations and results during the present year.—Minor repairs were made, work left unfinished at the close of the preceding season was completed, an upstream extension of 1,000 feet was made, and a gap of 780 feet completed. The work aggregated 6,948 squares of channel and connecting mats; 1,943 squares of upper bank paving, of which 1,133 squares was concrete and 810 squares riprap paving. The location of the work is shown on plate 4 accompanying. Total expenditures (not including prorated amount of cost of care, depreciation, and maintenance of plant) were \$84,882.34, of which \$64,627.92 was for new work and \$20,254.92 was for repairs and maintenance. Details of costs and expenditures are given in the table following:

PANTHER FOREST REVETMENT (452 R.), THIRD DISTRICT.

Mattresses, total area 6,948 squares (channel, 60 per cent; connecting, 40 per cent).¹

BUILDING MAT.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization ²		\$737.41		\$0.106
1/2-inch strand ³ pounds.....	54,027	3,888.94	7.78	.580
1/4-inch strand ³ do.....	19,136	1,094.58	2.75	.138
1/2-inch strand ³ do.....	67,908	4,278.08	9.77	.615
Spikes ³ do.....	800	24.80	.12	.004
Staples ³ do.....	1,200	44.40	.17	.006
Clips, 1/2-inch ³ number.....	350	33.25	.05	.013
Clips, 1/4-inch ³ do.....	800	88.00	.12	.012
Brush and poles ³ cords.....	11,654	14,126.98	1.68	2.035
Rope, manilla ³ pounds.....	4,309	775.53	.62	.109
Coal ³ tons.....	40.4	121.20		.017
Miscellaneous expenses ³		1,182.86		.170
Subsistence ³		3,418.50		.492
Steamboat expenses ³		206.93		.030
Labor ³		7,598.82		1.094
Supervision ³		2,044.05		.294
Total.....		39,675.33		

BALLASTING AND SINKING.

Mobilization and demobilization ²		\$268.71		\$0.053
Stone ³ tons.....	6,195	12,404.25	0.89	1.787
Rope, manilla ³ pounds.....	4,308	775.53	.62	.110
Miscellaneous expenses ³		591.43		.083
Subsistence ³		1,046.50		.150
Steamboat expenses ³		206.93		.030
Labor ³		2,228.43		.321
Supervision ³		1,022.08		.147
Total.....		18,643.81		

For explanation of footnotes see Lake Bolivar Revetment table (p. 3556).

Grading.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Coal ⁴ tons.....		\$908.20		\$0.211
Oil ⁵		25.00		.006
Miscellaneous expenses ⁵		305.15		.071
Subsistence ⁶		988.22		.230
Labor ⁷		3,406.61		.791
Total.....		5,633.18		

Paving.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization ¹		\$593.20		\$0.137
Stone ² tons.....	2,264	4,532.30	2.79	5.595
Cement ³ sacks.....	3,841	1,566.36	3.39	1.383
Sand and gravel ³ cubic yards.....	1,147	907.62	1.01	1.120
Oil ⁵ tons.....	42	126.52		.062
Miscellaneous expenses ⁵		615.37		.317
Subsistence ⁶		2,514.00		1.294
Labor ⁷		5,033.15		2.590
Supervision ⁸		1,022.02		.526
Total.....		16,910.45		
Total field cost ¹⁰		* 80,862.77		

Summary of costs (linear feet revetted, 1,780).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square.	Total.		
Total field cost.....	\$8.39	\$58,319.14	\$11.60	\$22,543.63	\$80,862.77	\$33.84
Office expenses.....					3,888.07	
Repairs ⁴					132.00	
Care of plant ¹¹					1,238.04	
Repair of plant ¹²					3,632.16	
Depreciation of plant.....					4,194.10	
Total.....					93,947.14	41.40

* Includes repairs amounting to \$20,254.95.

For explanation of footnotes see Lake Bolivar revetment table (p. 3556).

Condition at end of year.—The work is in good condition except for some 3,000 squares of bank paving that could not be placed on account of shortage of materials and now remains to be placed in order to complete the work done during the year. The effective length of the revetment is 7,500 feet. Active caving is in progress for 1½ miles above the revetment, but further extension can probably be deferred for a season or two.

Local cooperation.—None.

Proposed operations.—It is proposed to complete the work left unfinished at the close of the season.

Effect of improvement.—The bank has been held, the levee saved, and the channel permanently located.

(d) *Leland Neck, Ark.*

Location.—Four hundred and seventy-one miles below Cairo, right bank.

Original condition.—In 1880 the width of the neck at the narrowest point was approximately 5,500 feet. The banks continued to cave at this point until the width of the neck was reduced to 2,600 feet, and it was necessary torevet the bank to prevent a cut-off. A cut-off at this point would have had a disastrous effect on the regimen of the river similar to that described at Ashbrook Neck.

Previous projects.—None.

Present project.—To prevent a cut-off and fix the channel by bank revetment.

Operations and results prior to the present year.—Bank revetment, consisting of fascine mats below the water and riprap paving above, has been placed at this point, as follows: Season 1909-10, approximately 3,000 feet; season 1910-11, 1,000 feet; season 1911-12, approximately 1,000 feet. The cost of work prior to the present fiscal year amounted to \$187,956 for original work and extensions, and \$8,385.66 for maintenance, a total of \$196,341.66.

Operations and results during the present year.—No work was done. The expenditures, \$1,013.44, were for surveys and share of cost of care and repairs of plant.

Condition at end of year.—The work is in good condition. Effective length is 5,000 feet. A slight caving has set in below the revetment, but has not flanked the revetment to any appreciable extent.

Local cooperation.—None.

Proposed operations.—It is proposed to make necessary repairs to maintain the work in good condition.

Effect of improvement.—The revetment placed at this point has protected the bank, prevented a cut-off, and permanently located the channel.

(e) *Greenville Harbor, Miss.*

Location.—Four hundred and seventy-eight miles below Cairo, left bank.

Original condition.—Caving has been in progress since the earliest surveys—1879-80. During the 12 years from 1882 to 1894 the bank in the Greenville Bend receded about 4,000 feet. A large portion of the town of Greenville had caved into the river and the complete demolition of the remainder of the town and harbor was threatened. New levee loops had been repeatedly constructed to cover the front line, being breached by caving, and been in turn destroyed.

Previous projects.—The original project, adopted in 1887, provided for protection of the bank by means of submerged spur dikes.

Present project.—Adopted in 1891; provides for protection of the bank with continuous revetment.

Operations and results prior to the present fiscal year.—Work under the previous projects commenced in 1887. Twelve submerged crib dikes founded on woven mats and one longitudinal pile dike were placed between 1887 and 1889. During the flood of 1891 the upper four dikes were flanked, and it was then decided to make the mats continuous between the dikes and to adopt the woven-mat type of construction with riprap upper-bank paving, placing the work in continuous stretches. From 1891 to 1894, 14,500 feet of this class of revetment was constructed. In 1896 repeated local failures and breaches indicated the woven type of mats to be too frail; the standard fascine type was adopted and work of reinforcing the entire length of revetment was commenced. From 1896 to 1905, 10,700 feet of the woven mats were thus reinforced. Rapid caving occurred in the bend above the effective revetment, causing excessive flanking each year. In 1910 the effective length of continuous revetment was 12,500 feet and 800 feet of disconnected dikes at the extreme lower end. In 1912 an extension of 1,000 feet was made upstream. The high waters of 1913 caused a failure of about 800 feet below the reinforced mats. In 1913 and 1914 this breach was repaired, the remaining woven mats, with the exception of about 1,000 feet, were reinforced with fascine mats, and a further extension of about 1,000 feet was made upstream. In 1915 and 1916 further extensions of 3,000 and 2,015 feet, respectively, upstream were made and minor repairs made. As a result of this work the bank where revetted has been successfully held; further losses from caving in the town of Greenville prevented and the controlling levee line along the length of revetment protected. The expenditures prior to the present fiscal year have been \$1,136,457.29 for original work and extensions and \$341,943.75 for repairs and renewals, a total of \$1,478,501.04.

Operations and results during the present year.—Work left unfinished at the close of the preceding season was completed and an upstream extension of 1,070 feet was made. A failure of the upper-bank work between stations 11 and 14 and a slough in the bank along the city front just below the end of the settlement, between two of the old spur dikes, were repaired. The work aggregated 3,442 squares of channel, connecting, and pocket mats and 3,010 squares of concrete paving, of which amounts 520 squares of mat work and 926 squares of paving were for maintenance and the balance for extensions. Location of work is shown on plate 5, accompanying. The total expenditures (not including amount of cost of care, depreciation, and maintenance of plant) were \$190.51 of which amount \$31,788.34 was for new work and \$8,171.57 for maintenance. Detailed data of cost of work is given in tables following.

GREENVILLE, MISS. (478 L.), THIRD DISTRICT—NEW WORK.

Maintenance, total area 2,922 squares (channel, 92 per cent; connecting, 8 per cent).¹

BUILDING MAT.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Maintenance and demobilization ²		\$240.30		\$0.082
Mat strand ¹ pounds.....	16,300	1,548.60	5.58	.530
Mat strand ¹ do.....	10,450	597.74	3.57	.204
Mat strand ¹ do.....	27,232	1,715.62	9.32	.587
Mat ¹ do.....	500	15.50	.17	.005
Mat ¹ do.....	200	7.40	.07	.003
Mat and poles ¹ cords.....	4,928	5,978.64	1.70	2.046
Mat and poles ¹ pounds.....	2,391	450.29	.81	.151
Mat and poles ¹ tons.....	47	129.92		.048
Mat and poles expenses ³		495.77		.170
Mat and poles ¹		1,356.50		.464
Mat and poles expenses ³		132.45		.045
Mat and poles ¹		2,937.38		1.005
Mat and poles ¹		549.41		.181
Total.....		16,166.42		

BALLASTING AND SINKING.

Maintenance and demobilization ²		\$120.15		\$0.041
Mat strand ¹ tons.....	2,168	4,307.79	0.74	1.474
Mat strand ¹ pounds.....	2,390	450.29	.82	.154
Mat strand ¹		248.84		.085
Mat and poles expenses ³		341.50		.117
Mat and poles ¹		132.50		.045
Mat and poles expenses ³		860.54		.295
Mat and poles ¹		274.70		.094
Total.....		6,736.31		

Grading.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mat strand ¹ tons.....		\$126.23		\$0.170
Mat strand ¹		3.50		.004
Mat and poles expenses ³		7.50		.009
Mat and poles ¹		125.98		.157
Mat and poles ¹		468.53		.586
Total.....		741.74		

3562 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Paving.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization ¹		\$120.15		
Stone ² tons.....	135	270.31	2.70	\$5.405
Cement ³ sacks.....	7,521	3,067.04	3.51	1.431
Sand and gravel ⁴ cubic yards.....	2,259	1,787.55	1.95	.834
Coal ⁵ tons.....	58	122.68	.08	.079
Miscellaneous expenses ⁶		261.18		.128
Subsistence ⁷		1,289.50		.594
Labor ⁸		2,668.41		1.217
Supervision ⁹		274.71		.125
Total.....		9,922.55		
Total field cost ¹⁰		* 83,567.02		

* Includes repairs amounting to \$4,068.10.

Summary of costs (linear feet revetted, 1,070).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square.	Total.		
Total field cost.....	\$7.84	\$22,902.73	\$4.86	\$10,664.29	\$33,567.02	\$39.66
Office expenses.....					1,801.42	
Surveys ¹¹					458.00	
Care of plant ¹²					1,074.90	
Repair of plant ¹³					3,124.56	
Depreciation of plant.....					3,607.90	
Total.....					43,613.80	36.95

For explanation of footnotes see Lake Bolivar revetment table (p. 3556).

GREENVILLE, MISS. (478 L.), THIRD DISTRICT—REPAIR WORK.

Mattresses, total area 520 squares (connecting, 100 per cent).¹

BUILDING MAT.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization ¹		\$118.41		\$0.228
1-inch strand ² pounds.....	2,898	208.66	5.57	.401
1-inch strand ³ do.....	1,706	97.58	3.28	.187
1-inch strand ⁴ do.....	4,955	312.17	9.53	6.003
Spikes ⁵ do.....	30	1.55	.01	.003
Staples ⁶ do.....	150	5.55	.26	.011
Clips, 1-inch ⁷ number.....	20	1.90	.04	.004
Clips, 1/2-inch ⁸ do.....	10	1.10	.02	.002
Brush and poles ⁹ cords.....	902	1,090.94	1.75	2.096
Subsistence ¹⁰		150.00		.289
Labor ¹¹		299.13		.575
Supervision ¹²		42.53		.082
Total.....		2,329.52		

BALLASTING AND SINKING.

Stone ¹ tons.....	520	\$1,041.20	1	\$2.009
Subsistence ²		58.50		.113
Labor ³		92.46		.182
Supervision ⁴		18.50		.034
Total.....		1,210.66		

Grading.

		Quantity used.		Per square.	
		Total quantity.	Total cost.	Quantity.	Cost.
Coal	tons	44	\$182.00	0.07	\$0.230
Oil			7.50		.012
Substance			111.50		.186
Labor			312.29		.525
Total			563.29		
Total field cost			4,103.47		

Summary of costs.

	Subaqueous work.		Upper bank work, total.	Grand total.
	Per square.	Total.		
Total field cost	\$6.81	\$3,540.18	\$563.29	\$4,103.47

For explanation of footnotes see Lake Bolivar Revetment table (p. 3556).

Condition at end of year.—The effective length of the revetment is 21,000 feet. The condition of the work is good, except that placed to repair the slough just below the lower end of the revetment. This work failed near the close of the season, and could not be repaired before high water. Only slight caving is taking place at the upper end of the revetment. No caving is occurring below the revetment.

Local cooperation.—The town of Greenville contributed \$42,277.10 in 1887.

Proposed operations.—It is proposed to extend the revetment approximately 1,000 feet downstream and to make such repairs as may be necessary for maintenance.

Effect of improvement.—The bank in this bend, as far as revetted, has been held and the channel has been permanently located. The entire city of Greenville has been protected, confidence in the stability of the river bank has been restored, permitting the city to grow normally without fear of destruction, and further expensive retirements of the controlling levee line have been made unnecessary.

(f) Vauclose, Ark.

Location.—Four hundred and eighty-seven miles below Cairo, right bank.

Original condition.—The levee at this point was built near the lower end of Lake Chicot, and could not be set back without great cost. Caving has been in progress since the earliest surveys, 1879-80, and had caused the bank to approach so close to the levee as to endanger its further life unless revetment was placed.

Previous projects.—None.

Present project.—The present project is to protect the levee by means of continuous bank revetment.

Operations and results prior to the present year.—Bank revetment consisting of fascine mats below the water and riprap paving above has been placed at this point, as follows: Season of 1908-9, approximately 2,000 feet; season of 1910-11, approximately 1,000 feet; and season of 1911-12, approximately 1,000 feet. This revetment effectively checked the caving, except for a slight flanking at the upper end, which was repaired during the fiscal year 1915. The total cost of work prior to the present fiscal year amounted to \$161,042 for original work and extensions and \$9,812.16 for repairs and maintenance, a total of \$170,854.16.

Operations and results during the present year.—Repairs were made to the upper bank work where failures had occurred. The work aggregated 1,655 squares of connecting mat and 252 squares of concrete paving. Shortage of

material resulted in leaving unfinished 400 squares of paving. Expenditures amounted to \$13,512.44, all of which was for maintenance. Location of work is shown on plate 6. accompanying. Details of cost of work are given in the following table:

Mattresses, total area 1,655 squares (connecting 100 per cent).

VAUCLUSE, ARK. (467 R.), THIRD DISTRICT.

BUILDING MAT.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization ¹		\$80.00		\$0.037
1/4-inch strand ².....pounds.	8,227	592.14	4.97	.358
1/2-inch strand ².....do.	5,428	310.48	3.28	.187
1-inch strand ².....do.	25,262	1,391.51	15.21	.841
Spikes ².....do.	210	6.51	.13	.004
Staples ².....do.	105	3.88	.06	.002
Clips, 1/4-inch ².....number.	25	2.28	.02	.001
Clips, 1/2-inch ².....do.	25	2.75	.02	.002
Brush and poles ².....cords.	2,271	2,748.39	1.37	1.661
Coal ⁴.....tons.	70	208.44	.04	.126
Miscellaneous expenses ⁴		25.00		.015
Subsistence ⁶		587.50		.360
Labor ⁸		1,350.31		.816
Supervision ⁹		140.10		.085
Total.....		7,429.27		

BALLASTING AND SINKING.

Stone ².....tons.	1,285	\$3,509.80	0.72	\$1.553
Subsistence ⁶		132.00		.080
Labor ⁸		263.75		.159
Supervision ⁹		23.10		.014
Total.....		2,988.65		

Grading.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Coal ⁴.....tons.	146.8	\$440.40	0.21	\$0.629
Oil ⁴		5.09		.007
Subsistence ⁶		166.00		.220
Labor ⁸		477.62		.682
Total.....		1,089.02		

Paving.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Cement ².....sacks.	820	\$334.40	3.25	\$1.323
Sand and gravel ⁴.....cubic yards.	235	185.96	.93	.788
Coal ⁴.....tons.	10	28.56	.04	.112
Subsistence ⁶		399.00		1.583
Labor ⁸		736.87		2.924
Supervision ⁹		38.50		.153
Total.....		1,857.50		
Total field cost ¹⁰		13,364.44		

Summary of costs.

	Subaqueous work.		Upper bank work.		Grand total.
	Per square.	Total.	Per square.	Total.	
Final field cost.....	\$6.29	\$10,417.92	\$11.69	\$2,996.52	\$13,364.44
Other expenses.....					75.00
Surveys.....					73.00
Use of plant.....					261.43
Repair of plant.....					767.04
Depreciation of plant.....					886.08
Total.....					15,426.44

For explanation of footnotes see Lake Bolivar Revetment table (p. 3556).

Condition at end of year.—There is in place 3,925 feet of effective bank protection in good condition except for upper bank paving left unfinished at close of year. Slight flanking is taking place at the upper end.

Local cooperation.—None.

Proposed operations.—It is proposed to make such repairs as may be needed and to check flanking at the upper end if necessary.

Effect of improvement.—The work accomplished has protected the bank, thus obviating the necessity of building a new and expensive loop, and has permanently located the channel.

(g) Longwood, Miss.

Location.—Five hundred miles below Cairo, left bank.

Original condition.—Caving has been in progress since the earliest surveys—1879-80. In 1904 the Longwood Levee, one of the largest on the river, was examined and careful investigation proved that bank revetment would be cheaper than a relocation of the levee.

Previous projects.—None.

Present project.—To protect the large and important levee line at this locality by bank revetment.

Operations and results prior to the present year.—Work was commenced in 1904, and during the season 1904-5, 4,200 feet of standard fascine revetment was placed. The work was successful in stopping the caving; no extensions have been needed and no repairs have been made. The work is now shielded from the direct flow of the main channel of the river by a sand bar which began to form in 1906. The total expenditure prior to the present year has been \$153,607.08, all for original construction and share in cost of annual repairs.

Operations and results during the present year.—No work was required. The expenditures, \$844.38, were for surveys and share of cost of care, repairs, and depreciation of plant.

Condition at end of year.—The effective length of the work is 4,200 feet, all in good condition and shielded from the direct flow of the main channel of the river by a sand bar which has formed opposite the work.

Local cooperation.—The Board of Mississippi Levee Commissioners contributed \$11,000.45 in 1905.

Proposed operations.—None.

Effect of improvement.—The caving which had been proceeding for more than 25 years was effectively checked. The construction of a levee loop estimated to cost \$335,000 was obviated with an expenditure of a little over \$150,000. The channel has been permanently located.

(h) Grand Lake, Ark.

Location.—Five hundred and ten miles below Cairo, right bank.

Original condition.—The levee at this point was built across the bed of Grand Lake where a new loop would have been very expensive. Caving has been in progress since the earliest surveys—1879-80—and by 1911 had so reduced the distance between the bank and the levee as to make it essential to either revet the bank or build a new levee.

Previous projects.—None.

Present project.—To protect the levee and fix the channel at this point by means of continuous bank revetment.

Operations and results prior to the present year.—During the season 1911-12, 3,900 feet of bank revetment consisting of fascine mats below the water and rip-rap paving above was placed. This work was extended upstream 1,800 feet during 1914-15 season. Minor repairs have been made from time to time. The revetment placed has effectively checked the caving along the bank protected. The total expenditures for work prior to the present fiscal year amounted to \$259,908.66 for original work and extensions and \$6,523 for maintenance, a total of \$266,428.66.

Operations and results during the present year.—No work was done during the year. Expenditures, which amounted to \$1,688.76, were for surveys, and share of cost of care, repairs, and depreciation of plant.

Condition at end of year.—There is in place 8,500 feet of revetment, all in good condition, except for some minor breaks in the upper bank paving. Caving continues above the revetment, and a further extension upstream will eventually be necessary. Caving has again set in below the revetment, and an extension downstream will be necessary in the near future.

Local cooperation.—None.

Proposed operations.—Such repairs as may be necessary will be made.

Effect of improvement.—The work accomplished has permanently fixed the channel, protected the bank, and obviated the necessity of building a new and costly levee.

(i) *Lake Providence Reach.*

Location.—Five hundred and seventeen to five hundred and fifty miles below Cairo.

Original condition.—This and Plum Point Reach were originally selected by the commission for improvement, on account of the exceptional difficulties encountered there. Caving was excessive; the channel was not clearly defined, being divided into numerous branches by islands, and depths as small as 4½ feet were occasionally found on its crossings.

Previous projects.—The original project adopted in 1881 provided for securing a low-water channel with an approximately uniform width of 3,000 feet, by constructing contraction works, closing all chutes, and holding caving banks. In 1896, due to the development of hydraulic dredging, the project for the reach as a whole was definitely abandoned, with the exception of repairs to revetments.

Present project.—Repairs to revetments.

Operations and results prior to the present year.—To close chutes and diminish the low-water width of the river, permeable dikes were constructed at Duncansby Crossing, Cottonwood, Mayersville, Elton, Baleshed, and Stack Island, and have been fully described in the early reports of the commission. Their first effect was very beneficial. A deposit of from 6 to 18 feet was found behind them the first season; chutes were closed, and the river at low water contracted and confined to a single channel of the width prescribed in the project. During the years 1884 and 1885 the least depth on crossings was 11 feet.

The early efforts torevet caving banks were unsuccessful. The width given to the subaqueous mats did not exceed 150 feet, and they probably contained an insufficient amount of brush to prevent scour through them. They were rapidly undermined and destroyed, leaving the contraction works exposed to attack. On account of lack of funds for several years, and by reason of the proviso of the river and harbor act of August 5, 1886, which prohibited the construction of revetment works, attempts to prevent the banks from caving were not resumed until 1889. During the intervening period a rapid increase in the rate of caving in this reach was observable; dikes on the concave side of bends were flanked and destroyed; when they were constructed on the convex side, by the caving of the opposite bank the low-water channel was removed from their sphere of influence, and by 1888 the width of the low-water channel had materially increased.

While, however, the changes in the river channel have been great, the abnormal conditions which existed prior to the construction of contraction works have not reappeared, and the river tends to flow in a single channel during

low water, even where the works to confine it to that channel have been destroyed. It has resulted that, though bars form which are obstructive to navigation, the river currents more rapidly cut a channel through them than formerly.

Since the resumption of revetment construction in 1889 work has been limited to the revetment of Louisiana Bend and Lake Providence. At Louisiana Bend 3,820 feet of bank was revetted between 1889 and 1893, which was repaired in 1896 and 1897. Since that date it has received no attention, and 4,520 feet have been lost by flanking at its lower end. At Lake Providence 12,800 feet of bank was revetted between 1894 and 1896, and as this work not only was a portion of the general project for the improvement of the reach, but also produced a large levee across the foot of Lake Providence and the town of the same name, the revetment has been maintained and at present has an effective length of 12,000 feet.

The expenditures on this reach have amounted to \$3,943,868.70; included therein is an expenditure on the revetment at Lake Providence of \$383,983 for original work and extensions and \$182,112.24 for maintenance, a total of \$66,095.24.

Operations and results during the present year.—None. The expenditures, which amounted to \$4,787.86, were for surveys, and share of cost of care and repairs of plant.

Local cooperation.—None.

Proposed operations.—None.

(j) *Fillers Bend, Miss.*

Location.—Five hundred and fifty miles below Cairo, left bank.

Original condition.—Caving has been in progress since the earliest surveys, 1853-54. In 1906 the large levee at Fillers became endangered from caving, and investigations showed revetment to be cheaper than a relocation of the levee.

Pending projects.—None.

Present project.—To fix the channel, and prevent the destruction of the confluence levee line at this point by bank revetment.

Operations and results prior to the present year.—Work was commenced in 1906 when 2,000 feet of standard fascine revetment was placed, which was extended 1,000 feet upstream in 1910, and 200 feet downstream to check flanking in 1911, making a total of 3,200 feet. In 1912 the rapid caving below the revetment necessitated a further extension downstream of 600 feet. A gap of 200 feet was left unprotected, and then 5,200 feet of revetment was placed to protect a long line of levee in immediate danger of caving off. The lower reach of the levee was extended upstream 1,000 feet and downstream 1,900 feet in 1913-14, which reduced the unprotected gap to 1,300 feet. Repairs have been made from time to time as necessary. The work has been entirely successful, but was badly damaged by the high water of 1916. The expenditures prior to the present year have been \$468,628 for original work and extensions, and \$69,222.63 for repairs and renewals, a total of \$537,850.63.

Operations and results during the year.—Work was commenced August 17, 1917, and the gap originally left in the revetment was closed. Extensive repair work was next undertaken to replace the work lost during and following the high water, and continued until in March, 1917. Shortage of material and the high water made it impossible to complete all the repair work. In closing the gap, which was new work, 3,300 squares of channel mat and 1,200 squares of concrete bank paving was placed. On the repair work 1,200 squares of channel and connecting mats were placed. It was impossible to place any upper bank paving on account of shortage of material. Location of work is shown on plate 7 accompanying. The total expenditures (excluding prorated cost of care, depreciation, and maintenance of plant) were \$42,296, of which amount \$33,073.90 was for new work, and \$82,939.06 for maintenance. Details of cost of work are given in the tables following:

3568 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

FITLERS BEND, MISS. (550 L.), THIRD DISTRICT—NEW WORK.

Mattresses, total area 3,300 squares (channel, 83 per cent; connecting, 17 per cent).¹

BUILDING MAT.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization ¹		\$326.22		\$0.099
1/4-inch strand ¹.....pounds..	26,046	1,875.31	7.89	.568
1/2-inch strand ¹.....do.....	6,680	382.10	2.03	.116
1-inch strand ¹.....do.....	39,767	2,518.49	12.10	.763
Spikes ¹.....do.....	1,500	46.50	.46	.001
Staples ¹.....do.....	613	22.68	.18	.007
Clips, 1/4-inch ¹.....number..	275	19.80	.09	.116
Clips, 1/2-inch ¹.....do.....	175	10.01	.05	.003
Brush and poles ¹.....cords..	5,608	6,993.78	1.70	2.118
Rope, manila ¹.....pounds..	725	130.50	.22	.040
Coal ¹.....tons.....	32	96.00		.029
Miscellaneous expenses ¹		254.23		.077
Subsistence ¹		1,458.00		.440
Steamboat expenses ¹		35.00		.016
Labor ¹		2,689.56		.815
Supervision ¹		200.00		.067
Total.....		17,055.18		

BALLASTING AND SINKING.

Mobilization and demobilization ¹		\$163.11		\$0.049
Stone ¹.....tons.....	3,300	6,607.59	1.00	2.002
Rope, manila ¹.....pounds..	725	130.50	.22	.040
Coal ¹.....tons.....	2	6.00		.002
Miscellaneous expenses ¹		127.11		.039
Subsistence ¹		284.50		.086
Steamboat expenses ¹		35.00		.001
Labor ¹		534.31		.162
Supervision ¹		99.50		.030
Total.....		7,987.62		

Grading.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Coal ¹.....tons.....	140	\$420.00	0.08	\$0.226
Oil ¹		15.00		.008
Subsistence ¹		253.50		.136
Labor ¹		1,118.08		.601
Total.....		1,806.58		

Paving.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization ¹		\$163.10		\$0.088
Cement ².....sacks.....	2,841	1,158.76	2.04	.830
Sand and gravel ³.....cubic yards.....	863	682.89	.62	.489
Coal ⁴.....tons.....	37	111.90	.02	.060
Miscellaneous expenses ⁵		127.12		.068
Subsistence ⁶		1,089.00		.586
Labor ⁷		2,066.98		1.111
Total.....		5,399.75		
Total field cost ¹⁰		32,249.13		

Summary of costs (linear feet revetted, 1,300).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square.	Total.		
Total field cost.....	\$7.59	\$25,042.80	\$3.87	\$7,206.33	\$32,249.13	\$25.44
Office expenses.....					\$24.77	
Surveys ¹¹						
Care of plant ¹²					1,538.00	
Repair of plant ¹³					4,612.00	
Depreciation of plant.....					5,280.00	
Total.....					44,403.90	34.15

For explanation of footnotes see Lake Bollvar Revetment table (p. 3556).

FITLERS BEND, MISS. (550 L.), THIRD DISTRICT—REPAIR WORK.

*Mattresses, total area, 11,159 squares (channel, 75 per cent; connecting, 25 per cent).¹***BUILDING MAT.**

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization ¹		\$1,205.15		\$0.108
1-strand ².....pounds.....	66,283	4,770.94	\$5.94	.427
1 1/2-inch strand ³.....do.....	39,969	1,286.23	3.58	.115
1-inch strand ⁴.....do.....	88,023	5,545.45	7.89	.497
Spikes ⁵.....do.....	2,640	81.84	.24	.007
Wips, 1/2-inch ⁶.....number.....	300	28.50	.03	.003
Chips, 1/2-inch ⁷.....do.....	480	50.60	.03	.005
Brush and poles ⁸.....cords.....	15,459	19,631.28	1.39	1.759
Rope, manila ⁹.....pounds.....	3,684	660.12	.33	.059
Coal ¹⁰.....tons.....	26	79.20		.007
Miscellaneous expenses ¹¹		440.91		.040
Subsistence ¹²		3,511.50		.315
Steamboat expenses ¹³		268.42		.024
Labor ¹⁴		7,864.84		.705
Supervision ¹⁵		1,177.00		.105
Total.....		46,601.98		

BALLASTING AND SINKING.

Stone ¹.....tons.....	8,713	\$17,445.24	\$0.78	\$1.563
Rope, manila ².....pounds.....	3,684	660.12	.33	.059
Coal ³.....tons.....	10	30.00		.003
Miscellaneous expenses ⁴		330.91		.030
Subsistence ⁵		1,765.50		.151
Steamboat expenses ⁶		268.43		.024
Labor ⁷		3,368.30		.302
Supervision ⁸		927.00		.083
Total.....		24,795.50		

Grading.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Coal ⁴.....tons..	645	\$1,934.00	0.11	\$0.322
Oil ⁴		50.00		.008
Miscellaneous expenses ⁵		110.00		.013
Subsistence ⁶		952.50		.159
Labor ⁸		2,732.45		.455
Total.....		5,778.99		

Paving.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Stone ².....tons..	195	\$390.00	\$3.90	\$7.80
Cement ².....sacks..	1,033	421.28	3.54	1.408
Sand and gravel ².....cubic yards..	296	234.22	1.00	.802
Coal ⁴.....tons..	7	20.40		.060
Subsistence ⁶		437.00		1.272
Labor ⁸		741.81		2.168
Supervision ⁹		250.00		.731
Total.....		2,949.60		
Total field cost ¹⁰		79,671.16		

Summary of costs.

	Subaqueous work.		Upper bank work, total.	Grand total.
	Per square.	Total.		
Total field cost.....	\$6.40	\$71,297.48	\$8,273.68	\$79,671.16
Office expenses.....				3,158.90
Surveys ¹¹				199.00
Care of plant ¹²				230.40
Repair of plant ¹²				676.80
Depreciation of plant.....				781.56
Total.....				84,627.82

For explanation of footnotes see Lake Bolivar Revetment table (p. 3556).

Condition at end of year.—The effective length of the revetment is 8,450 feet. The work is in good condition above the gap, but the work below the gap is in such bad condition as to be almost a total loss.

Local cooperation.—None.

Proposed operations.—It is proposed to repair the work below the gap and to make such other repairs as may be necessary.

Effect of improvement.—Caving has been effectively checked along the full reach revetted, and the channel has been fixed in position. The relocation of a long line of levee has been obviated.

(k) Cottonwood, Miss.

Location.—Five hundred and fifty-eight miles below Cairo, left bank.

Original condition.—Prior to 1913 this bank had been relatively stable for many years, but following the 1913 flood serious caving set in, which amounted to 400 feet in 1914, 1,100 feet in 1915, and 1,500 feet in 1916. In 1915 a new levee

was constructed about 1,000 feet back of the old levee, but the caving of the following season destroyed a considerable portion of the work and it became evident that it would be necessary either to fix the channel by means of revetment or else build a levee across the point and throw out a large area of land. Revetment was therefore decided upon.

Previous projects.—None.

Present projects.—To protect the bank, fix the channel in position, and protect the levee by means of continuous revetment along the caving bank in this bend.

Operations and results prior to the present year.—None.

Operations and results during the year.—Work was commenced on September 26, 1916, and continued until March 22, 1917, when high water prevented further operations. Channel mats were sunk covering the bank for a distance of 8,060 feet. The upper bank was paved with concrete to full height for 4,000 feet and to half height for the balance of the distance, except for about 1,000 feet where the last mat was sunk at practically a bank-full stage. The work, all of which was new work, aggregated 23,420 squares of channel and connecting mat and 5,894 squares of concrete paving. The work prevented further caving, except along the last mat sunk, where an ugly pocket formed before the mat could be gotten down, but even then the caving was not sufficient to seriously threaten the levee. Location of work is shown on plate 8 accompanying. Expenditures (excluding prorated cost of care, depreciation, and maintenance of plant) amount to \$210,573.66, all for new work. Detailed cost of work is given in the following table:

COTTONWOOD, MISS. (558 L.), THIRD DISTRICT.

Mattresses, total area, 23,420 squares (channel, 87 per cent; connecting 13 per cent).¹

BUILDING MAT.

		Quantity used.		Per square.	
		Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization ²			\$1,486.71		\$0.063
1/4-inch strand ³	pounds	151,958	10,940.98	6.49	.467
1/2-inch strand ³	do	77,985	4,460.74	3.33	.194
1/4-inch strand ³	do	211,226	13,307.24	9.02	.568
Spikes ³	do	3,000	93.00	.13	.004
Staples ³	do	3,000	111.00	.13	.005
Clips, 1/4-inch ³	number	475	34.20	.12	.001
Clips, 1/2-inch ³	number	375	21.45	.12	.001
Brush and poles ³	cords	38,051	48,701.74	1.62	2.037
Rope, manila ³	pounds	7,367	1,326.06	.31	.067
Coal ³	tons	272	815.88	.01	.035
Miscellaneous expenses ³			1,847.40		.079
Subsistence ³			9,530.00		.407
Steamboat expenses ³			475.00		.020
Labor ³			19,228.65		.821
Supervision ³			2,535.17		.121
Total.....			115,215.22		

BALLASTING AND SINKING.

Stone ³	tons	17,786	\$35,590.85	0.79	\$1.520
Rope, manila ³	pounds	7,367	1,326.06	.31	.067
Coal ³	tons	112	336.00		.014
Miscellaneous expenses ³			923.70		.039
Subsistence ³			2,242.50		.096
Steamboat expenses ³			475.00		.020
Labor ³			4,748.12		.203
Supervision ³			1,417.59		.061
Total.....			47,059.83		

Grading.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Coal ⁴ tons.....	548	\$1,645.20	0.07	\$0.216
Oil ⁴		45.00		.008
Miscellaneous expenses ⁵		250.00		.033
Subsistence ⁶		1,461.50		.192
Labor ⁷		3,529.13		.464
Total		6,930.83		

Paving.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Stone ⁸ tons.....	741	\$1,499.85	3.25	\$6.668
Cement ⁹ sacks.....	19,995	8,153.96	3.57	1.455
Sand and gravel ⁹ cubic yards.....	7,587	6,003.59	1.35	1.071
Coal ⁴ tons.....	215	645.00	.03	.107
Oil ⁴		25.00		.004
Miscellaneous expenses ⁵		923.70		.153
Subsistence ⁶		4,704.50		.780
Labor ⁷		10,349.00		1.715
Supervision ⁹		1,417.18		.235
Total		33,721.78		
Total field cost ¹⁰		202,927.66		

Summary of costs (linear feet revetted, 8,060).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square.	Total.		
Total field cost.....	\$6.92	\$162,275.05	\$6.74	\$40,652.61	\$202,927.66	\$25.18
Office expenses.....					7,500.00	
Surveys ¹¹					146.00	
Care of plant ¹²					2,782.09	
Repair of plant ¹³					8,163.27	
Depreciation of plant.....					9,424.81	
Total					230,943.83	28.65

For explanation of footnotes see Lake Bolivar Revetment table (p. 3556).

Condition at end of year.—The effective length of the revetment is 8,060 feet. The work is in good condition except along the last mat placed, where a new channel mat, some connecting mats, and upper bank paving will have to be placed, and except for uncompleted bank paving and some minor breaks in completed paving.

Local cooperation.—None.

Proposed operations.—It is proposed to complete the unfinished bank paving, repair breaks in paving, and replace the last mat sunk with new mats and bank paving properly located.

Effect of improvement.—Caving has been checked in the revetted reach except at one point. The channel has been fixed in position. The new and expensive levee just completed has been saved from destruction.

(l) *Albemarle Bend, Miss.*

Location.—Five hundred and sixty-eight miles below Cairo, left bank.

Original condition.—The bank in this bend has caved back $2\frac{1}{2}$ miles since the survey of 1879-80, and destroyed many miles of levees and thousands of acres of valuable land. On account of the proximity of Goose Lake, Five Mile Lake, and Steele Bayou behind the existing levee, there was no suitable economical location for a new loop, and it therefore became necessary to take steps to prevent further caving in the bend.

Previous projects.—None.

Present project.—To protect the levee in this bend by means of continuous bank revetment.

Operations and results prior to the present year.—During the season of 1910-11, approximately 11,650 feet of bank was revetted—10,000 feet with fascine mat work and 1,550 feet with sectional mat work, below the water—all with riprap paving above the water. During the season of 1912-13 an extension of 2,070 feet was made downstream. A great many repairs have been necessary in this bend to maintain the work in good condition. The breaks were mostly due to sand drainage. During the season of 1911-12 inshore breaks of about 1,800 feet were repaired, and in 1912-13 it was necessary to completely renew 1,035 feet of revetment. During the high waters of 1913 the formation of a channel through the sand bar, which now has become practically the main channel of the river, has so changed conditions that during high and medium stages there are two navigable channels—one around the bend and the other across the point. At extreme low water the old way around the bend is not navigable, and seems to be gradually closing up. The cost of work prior to the present year amounted to \$486,038 for original work and extensions, and \$148,109.92 for maintenance, a total of \$634,147.92.

Operations and results during the present year.—No work was done. Expenditures, which amounted to \$2,815.13, were for surveys and for this improvement's share in care, repair, and maintenance of plant.

Condition at end of year.—Work is in good condition, except for minor breaks in upper bank work. Effective length 13,720 feet. The main channel of the river is now across the bar and away from the revetment. Further extensions probably will be unnecessary.

Proposed operations.—It is proposed to make such repairs as may be necessary to maintain the work in good condition.

Local cooperation.—None.

Effect of improvement.—The work accomplished has protected the bank, and obviated the necessity of building a new levee at great cost.

(m) *Delta Point, La.*

Location.—Five hundred and ninety-eight miles below Cairo, right bank.

Original condition.—Succeeding the Centennial cut-off in 1876, very rapid erosion occurred on Delta Point and in the bend above, and the subsequent shifting of the channel leading from the river along the Vicksburg front, practically destroyed the harbor at Vicksburg for low-water commerce.

Previous projects.—In connection with the improvement of Vicksburg Harbor (see I a) the protection of Delta Point with bank revetment was authorized in the river and harbor act approved June 18, 1873.

Present project.—The river and harbor act approved August 2, 1882, placed the work under the supervision of the Mississippi River Commission. The continued protection of the point with bank revetment is proposed.

Operations and results prior to the present year.—Under previous projects, between 1879 and 1882, 5,400 feet of woven mat revetments, mats 150 to 175 feet wide, and one spur dike and two screen dikes were constructed at a total cost of \$203,229.87. Between the date of the transfer of the work to the commission in 1882 and 1885 about 6,500 feet of woven mats 300 feet wide and riprap upper bank work were placed, largely reinforcing the old revetment. Extensive repairs were made in 1890-1900. From 1901 to 1912 the work stood in good condition, no repairs being necessary. In 1912 a part of the old woven mat work at the lower end failed, necessitating considerable repairs and an extension of standard fascine mats downstream. No repairs have been necessary since. The work has been successful in maintaining the point in exactly the same position as when work was commenced in 1879. The expenditures prior to the present year have been \$420,546 for original work, reinforcements, and extensions, and \$36,416.29 for repairs and maintenance, a total of \$456,962.29.

Operations and results during the present year.—No work was done. The expenditures, \$1,182.30, were for surveys and this work's share of the cost of care and repairs of plant.

Condition at end of year.—The effective length of the revetment is 5,900 feet, all in good condition.

Local cooperation.—None.

Proposed operations.—Maintenance.

Effect of improvement.—Delta Point has been held in exactly the same position as when work was commenced in 1879. The channel of the river has been prevented from being deflected farther away from Vicksburg Harbor..

(n) *Mouth of Yazoo River and Harbor at Vicksburg, Miss.*

Location.—Five hundred and ninety-nine miles below Cairo, left bank.

Original condition.—Prior to 1876 the Mississippi River made a bend to the northeastward near the town of Delta, and another sharp bend to the southward just above the city of Vicksburg, flowing in a southerly direction in front of the city. In 1876 the river cut across the narrow neck of land lying in this sharp bend. Rapid caving followed in the cut-off and immediately above, causing the main channel to move to the southward, and the old channel in front of Vicksburg to fill, thus threatening to leave Vicksburg on a lake instead of on an open channel.

Previous projects.—The original project adopted by the river and harbor act approved June 18, 1878, provided for the protection of Delta Point, the construction of a bar dike, dredging out the inner harbor, and the diversion into Centennial Lake of the Yazoo River. In 1887 this project was modified to dredging a basin in front of the city to be connected to the river at Kleinston Landing by a canal; the basin to be inclosed on its north and west sides by an earthen dam to be constructed from the material dredged so as to limit the inflow of water during floods, and thus reduce the amount of deposit.

Present project.—The present project, adopted by the river and harbor act approved July 13, 1892, provides for the diversion of Yazoo River through an old bed of the Yazoo, and thence through Lake Centennial along the Vicksburg front to the Mississippi River.

Operations and results prior to the present year.—Between 1878 and 1881 there was built 5,400 linear feet of revetment at Delta Point, one mattress spur dike, and two screen dikes. The river and harbor act of August 2, 1882, placed this work under the Mississippi River Commission, and from this year until 1892 work was limited to revetment at Delta Point and dredging. The river and harbor act of August 18, 1894, transferred the work to the Engineer Department proper. Between 1892 and 1905 a canal was dredged across the low land between Old River and Lake Centennial, and the east arm of Lake Centennial in front of the city of Vicksburg was deepened, thus securing a 6-foot channel from the Mississippi River along the front of Vicksburg and thence to the Yazoo River proper. A levee dike, known as the West Pass Levee, was built in 1904 from the mouth of the canal below Vicksburg Harbor, westward along the West Pass Bar for a distance of 8,800 feet, with a view to confining the outflow of Yazoo River to the canal and breaking up the eddy action through the harbor division. The dike was enlarged in 1910. The river and harbor act approved March 4, 1913, transferred the work back again to the Mississippi River Commission, which has maintained the improvement since that date. The total expenditures prior to the present year were \$1,244,665.11, of which amount \$65,464.14 was for maintenance.

Operations and results during the present year.—No work was done, high stage of river throughout the year rendering work unnecessary. The maximum depth that can be carried at extreme low water is 3½ feet. On October 9, 1916, the balance of funds on hand and in the Treasury was transferred to the Vicksburg (Miss.) engineer district.

Condition at end of year.—Boats drawing 6 feet have access to the city of Vicksburg at all stages of water. The canal in front of the city has shoaled to a depth of 3½ feet at a point near the upper limits of the city. Some shoaling has also occurred at the point where the canal debouches into Lake Centennial, thus limiting the draft of boats ascending the Yazoo to 3 feet at extreme low water.

Local cooperation.—None.

Proposed operations.—This work is now under charge of the Vicksburg, Miss., engineer district.

Effect of improvement.—A good harbor has been maintained at Vicksburg.

(c) Vicksburg revetment.

Location.—Five hundred and ninety-nine miles below Cairo, left bank.

Original condition.—Subsequent to the cut-off, which occurred in 1876, and prior to the construction of the canal which diverted the Yazoo River along the Vicksburg front, this stretch of bank was not exposed to any current action, and even after the completion of the diversion canal it suffered no damage until the excessively high floods of 1912 and 1913, although the original section of the canal prism had scoured out to some extent. During the 1912 and 1913 floods unusually large amounts of water were discharged through the canal as a result of crevasses in the levee system and caused serious caving along the bank just above the point where the canal enters the Mississippi. Further caving occurred during succeeding high water, resulting in heavy losses to the Vicksburg, Shreveport & Pacific Railway, which was compelled to relocate its tracks, and to the compress companies established on the bank. If permitted to continue, the caving would have compelled the railroad to abandon its present point for crossing the Mississippi and would have destroyed considerable portions of the cotton sheds belonging to the compress companies. Revetment was therefore determined upon.

Previous projects.—None.

Present project.—To protect the bank by revetment, and thus save valuable properties, of a more or less public nature, from serious loss or destruction.

Operations and results prior to the present year.—None.

Operations and results during the present year.—Work was commenced in December and the bank revetted for a distance of 1,800 feet from the lower end of the reach to be protected; 4,024 squares of reinforced concrete mat and 2,419 squares of concrete bank paving were placed. Location of work is shown on plate 9. The total expenditures (excluding pro rata of cost of surveys, and care, depreciation, and maintenance of plant) amount to \$51,314.17, all for new work. Detailed cost of work is given in following table:

VICKSBURG HARBOR (599 L.), THIRD DISTRICT.

Mattresses, total area 4,024 squares (channel, 100 per cent).¹

BUILDING MAT.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization ²		\$209.08		\$0.052
Wire mesh ³.....squares.....	4,508	4,472.76	1.12	1.111
Paper ⁴.....pounds.....	4,577	423.37	1.14	.150
Forms ⁵.....number.....		1,391.04		.343
Rope, manila ⁶.....pounds.....		753.57		.187
Cement ⁷.....sacks.....	12,760	5,231.60	3.17	1.300
Sand and gravel ⁸.....cubic yards.....	38,517	2,542.32	.95	.632
Coal ⁹.....tons.....	93	279.00	.02	.069
Oil ¹⁰		50.00		.012
Miscellaneous expenses ¹¹		1,391.17		.346
Subsistence ¹²		738.50		.183
Labor ¹³		2,191.37		.544
Supervision ¹⁴		285.15		.078
Total.....		19,958.93		

BALLASTING AND SINKING.

Mobilization and demobilization ²		\$209.08		\$0.052
1-inch strand.....pounds.....	62,382	4,054.83	15.50	1.008
Clips, 1/2 inch ³.....number.....	24,260	1,637.55	6.04	.407
Rope, manila ⁶.....pounds.....		753.57		.187
Coal ⁹.....tons.....	63	189.00	.01	.044
Miscellaneous expenses ¹¹		1,391.17		.346
Subsistence ¹²		555.50		.138
Labor ¹³		1,714.27		.426
Supervision ¹⁴		285.15		.078
Total.....		10,790.12		

Grading.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Coal ⁴.....tons..	157.1	\$478.26	0.06	\$1.389
Oil ⁴		3.70		.001
Subsistence ⁶		1,446.50		.420
Steamboat expenses ⁷		315.85		.092
Labor ⁸		3,784.07		1.090
Total.....		6,028.38		

Paving.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization ²		\$209.08		\$0.085
Rope, manila ³.....pounds..		753.57		.312
Cement ³.....sacks..	12,095	4,958.95	5.00	2.060
Sand and gravel ³.....cubic yards..	3,802	2,559.32	1.57	1.037
Coal ⁴.....tons..	57	171.00	.02	.071
Oil ⁴		50.00		.021
Miscellaneous expenses ⁵		1,391.17		.575
Subsistence ⁶		369.50		.152
Labor ⁸		1,120.00		.463
Supervision ⁹		285.15		.118
Total.....		11,817.74		
Total field cost ¹⁰		48,595.17		

Summary of costs (linear feet revetted, 1,800).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square.	Total.		
Total field cost.....	\$7.64	\$30,749.05	\$7.38	\$17,846.12	\$48,595.17	\$26.95
Office expenses.....					2,500.00	
Surveys ¹¹					219.00	
Care of plant ¹²					872.58	
Repair of plant ¹³					1,534.08	
Depreciation of plant.....					1,771.27	
Total.....					55,492.10	30.83

For explanation of footnotes see Lake Bolivar Revetment table (p. 3556).

Condition at end of year.—The effective length of the revetment is 1,800 feet, all of which is in good condition.

Local cooperation.—None.

Proposed operations.—It is proposed to extend the revetment upstream, and complete the protection of the caving bank.

Effect of improvement.—The revetment in place protects the tracks of the Vicksburg, Shreveport & Pacific Railway from caving into the river.

(p) *Reid-Bedford Bend, La.*

Location.—Six hundred and three miles below Cairo, right bank.

Original condition.—Caving has progressed steadily since the surveys of 1879–80, and the bank receded about 1½ miles between that time and 1906, when the bank had approached so close to the levee as to threaten its existence. The land behind the levee is low and swampy and would have rendered the relocation

of the levee expensive and difficult. The bend is also very difficult to revet on account of sloughing banks, where large sections settle slowly and slide out, and deep water and swift current close to the shore.

Previous projects.—None.

Present project.—To protect the bank, fix the channel in position, and protect the levee by means of continuous revetment along the caving bank in front of the levee.

Operations and results prior to the present year.—Work was commenced in 1907, when about 2,000 feet of fascine mat work was placed, but on account of high water no upper-bank work was possible. One mat, 761 by 250 feet, was sunk, but three were successfully sunk. In 1908 the work was extended 1,400 feet upstream, and the upper bank along both old and new work was graded and paved with riprap. Brush protections were also placed on the upper bank at both up and down stream ends of the work. In 1909 and 1910 the work was extended 960 feet upstream by fascine mats and riprap upper-bank paving. In 1910-11 a further extension upstream of 1,880 feet was made by the fourth district by means of sectional mats and riprap upper-bank paving, and in the following year another upstream extension of 1,000 feet was made by the third district by means of fascine mats and riprap upper-bank paving. In 1914 a 4-foot fascine mat was sunk at the lower end of the work to replace a defective mat placed in 1906-7. The total expenditures have been \$380,915 for original mat and extensions and \$46,428.76 for repairs and maintenance, a total of \$427,343.76.

Operations and results during the present year.—Work was commenced December 29, 1916, the earliest date on which it was practicable to spare plant from pressing work, and was continued until January 10, 1917, when approaching high water compelled it to stop. One mat, 530 feet long and aggregating 1,325 squares was sunk opposite the exposed angle, about 3,600 feet below the lower end of the existing revetment. Location of the work is shown on plate 10. Expenditures (excluding pro rata of cost of surveys, and care, depreciation, maintenance of plant) amounted to \$15,206.14, all for new work. Detailed statement of work is given in the following table:

REID-BEDFORD BEND, I.A. (604 R.). THIRD DISTRICT.

Mattresses, total area 1,325 squares (channel, 100 per cent).¹

BUILDING MAT.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Station and demobilization *		\$472.56		\$0.357
Material:				
Fascine:	pounds 12,248	1,163.56	9.24	.878
Riprap:	do 1,075	61.49	.81	.046
Sectional mat:	do 19,541	1,231.08	14.67	.929
Brush:	do 200	6.20	.15	.005
Riprap:	do 800	11.10	.23	.008
Sectional poles:	cords 2,257	2,843.82	1.70	2.146
Fascine:	pounds 2,278	410.14	1.72	.309
Riprap:	tons 10	30.84	.01	.023
Various expenses:		287.05		.217
Material:		431.00		.325
Labor:		112.50		.085
Transportation:		831.21		.627
Maintenance:		431.11		.325
Total:		8,323.66		

BALLASTING AND SINKING.

Station and demobilization *		\$236.28		\$0.178
Material:	tons 1,011	2,085.20	0.79	1.574
Various expenses:		287.04		.217
Material:		128.50		.037
Labor:		301.17		.231
Transportation:		215.56		.163
Total:		3,369.25		

Grading.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization *.....		\$236.28		\$0.197
Coal *.....	140	420.00	0.12	.367
Miscellaneous expenses *.....		255.00		.212
Subsistence *.....		622.00		.518
Steamboat expenses *.....		25.00		.021
Labor *.....		1,422.95		1.186
Total.....		2,981.23		
Total field cost ¹⁰		14,674.14		

Summary of costs (linear feet revetted, 530).

	Subaqueous work.		Upper bank work, total.	Grand total.
	Per square.	Total.		
Total field cost.....	\$8.82	\$11,062.91	\$3,981.23	\$14,674.14
Office expenses.....				313.00
Surveys ¹¹				219.00
Care of plant ¹²				196.08
Repair of plant ¹³				575.28
Depreciation of plant.....				664.02
Total *.....				16,641.52

* Work not completed.

For explanation of footnotes see Lake Bolivar Revetment table (p. 3556).

Condition at end of year.—The work is in good condition. Due to bad drainage there are a number of small slides visible at low stage of the river. Further extensions downstream will probably be needed in the near future.

Local cooperation.—None.

Proposed operations.—Such work as may be necessary for maintenance, and an extension downstream of work started last season.

Effect of improvement.—The work accomplished at this point has fixed the channel in location and protected the bank and an important line of levee, thus obviating the necessity of building a new and costly levee.

(q) *Cummins, Ark.*

Location.—Arkansas River, 72 miles above mouth.

Original condition.—The rapidly caving bank at this point threatened the destruction of the levee protecting the State farm.

Previous projects.—None.

Present project.—The protection of the State farm levee by means of continuous bank revetment. This project was adopted in accordance with special provisions in the river and harbor act approved July 25, 1912.

Operations and results prior to the present year.—During 1913, 2,000 feet of bank was protected by means of fascine subaqueous mats and riprap upper bank paving. During the high water of 1914 this work was flanked at both ends. In 1914 extensions were made at both ends, bringing the total length of revetment up to 2,744 feet. Flanking continued at both ends of the work, indicating that it would be impossible to hold the work unless extensions of considerable length were made. The total expenditures amounted to \$52,025 for original work and extensions and \$228 for maintenance. The work was not successful.

Operations and results during the present year.—No work done on account of lack of funds.

Condition at end of year.—The work was destroyed by the 1915 floods in the Arkansas.

Local cooperation.—None.

Proposed operations.—None.

Effect of improvement.—The work postponed for a few years the moving back of the levee line, and thus permitted a few years' more use to be made of the land protected by the levee.

(r) *Red Fork, Ark.*

Location.—Arkansas River, 23 miles above mouth.

Original condition.—A rapidly caving bank threatened the destruction of a levee across the end of Lake Belcoe, the destruction of which would have necessitated building a loop of considerable length.

Previous projects.—None.

Present project.—Adopted 1907, provides for the protection of levee between Lake Belcoe and river bank by means of bank protection where caving threatens the levee.

Operations and results prior to the present year.—During 1908-9, 1,200 feet of bank was protected by fascine subaqueous mats and riprap upper bank paving. This work has successfully protected the levee it was built to save. The total expenditures prior to the present year were \$16,987 for original work and \$448.25 for maintenance, a total of \$21,935.25.

Operations and results during the present year.—On January 27, 1917, work of repairing and extending the revetment downstream was commenced. A total of 1,230 squares of reinforced concrete mat work and 190 squares of concrete upper bank paving was placed to repair breaks in old work, and 2,809 squares of reinforced concrete mat was placed, extending existing revetment 1,800 feet downstream. Location of the work is shown on plate 2, accompanying. Total expenditures (exclusive of prorated cost of care, depreciation, and maintenance of plant) amounted to \$40,556.38, of which \$30,776.28 was for new work and \$9,780.10 for maintenance. Details of cost of work are shown in the following table:

RED FORK, ARK., ARKANSAS RIVER, THIRD DISTRICT.

Mattresses, total area 5,680 squares.¹

BUILDING MAT.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization ²		\$969.78		\$0.171
Wire mesh.....squares.....	5,680	5,509.60	1.00	.970
Paper.....pounds.....	5,824	538.72	1.03	.095
1. rope, manila ³.....do.....		250.00		.044
Cement.....sacks.....	13,290	5,419.66	2.34	.954
Sand and gravel ⁴.....cubic yards.....	5,342	2,820.58	.93	.497
Coal.....tons.....	72	216.00	.01	.038
Miscellaneous expenses ⁵		476.27		.084
Subsistence ⁶		1,111.50		.196
Steamboat expenses ⁷		842.11		.148
Labor ⁸		1,973.91		.341
Supervision ⁹		205.62		.036
Total.....		20,333.75		

BALLASTING AND SINKING.

Mobilization and demobilization ²		\$969.78		\$0.240
1-inch strand.....pounds.....	73,894	4,285.85	18.30	1.061
Cable, 1-inch.....number.....	24,411	1,647.74	6.04	.406
1. rope, manila ³.....pounds.....		250.00		.062
Coal.....tons.....	180	540.00	.04	.134
Miscellaneous expenses ⁵		476.27		.118
Subsistence ⁶		1,059.00		.262
Steamboat expenses ⁷		842.11		.208
Labor ⁸		2,231.38		.552
Supervision ⁹		205.63		.061
Total.....		12,507.76		

Grading.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization ²		\$314.92		\$0.105
Coal ⁴.....tons..	138.8	418.40	0.05	.137
Miscellaneous expenses ⁵		158.92		.083
Subsistence ⁶		436.50		.145
Steamboat expenses ⁷		278.70		.088
Labor ⁸		1,344.03		.448
Total		2,949.47		

Paving.

	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization ²		\$314.92		\$1.657
Cement ³.....sacks..	886	361.31	4.66	1.902
Sand and gravel ⁴.....cubic yards..	300	158.40	1.57	.834
Coal ⁴.....tons..	20	60.00	.10	.316
Miscellaneous expenses ⁵		158.93		.336
Subsistence ⁶		194.00		1.021
Steamboat expenses ⁷		280.70		1.478
Labor ⁸		454.39		2.397
Supervision ⁹		136.75		.720
Total		2,119.40		
Total field cost ¹⁰		\$37,910.38		

* Includes repairs amounting to \$9,780.10.

Summary of costs.

	Subaqueous work.		Upper bank work, total.	Grand total.
	Per square.	Total.		
Total field cost.....	\$6.67	\$32,841.61	\$5,068.87	\$37,910.38
Office expenses.....				2,500.00
Surveys ¹¹				146.00
Care of plant ¹²				649.52
Repair of plant ¹³				1,917.60
Depreciation of plant.....				2,214.03
Total				45,337.53

For explanation of footnotes see Lake Bolivar Revetment table (p. 3556).

Condition of work at end of the year.—The effective length is 1,200 feet, which is in good condition and serves to protect the Lake Belcoe Levee. Work is in progress. Repairs are completed, but none of the extensions. Mats have been sunk for 1,800 linear feet on the extension. Repairs as well as extensions will be necessary from time to time.

Local cooperation.—None.

Proposed operations.—Repairs and extension downstream.

Effect of improvement.—The revetment has fixed the channel in location and prevented the Lake Belcoe Levee from being breached by the caving river bank and thus obviated the necessity of a new and expensive levee.

*Mississippi River Commission, third district—Data of cost of revctment,
June 1, 1916, to May 31, 1917.*

Location.	Expended as per financial statement.	Debits to material on hand.	Credit by material on hand.	Total field cost.	Unit field cost.		Unit overhead cost.	
					Per square.	Per linear foot.	Per square.	Per linear foot.
Lake Bolivar, Miss.....	\$34,599.53	\$3,577.00	\$1,482.78	\$36,699.75	\$8.12	\$30.06	\$1.65	\$5.04
Ashbrook Neck, Miss.....	7,009.87	26,499.50	31,536.00	1,973.37	8.98	33.84	1.47	7.56
Panther Forest, Ark.....	84,565.38	21,617.00	21,299.54	84,882.84	6.68	29.66	1.79	6.29
Greenville, Miss.....	40,987.03	9,262.41	10,339.53	39,909.91	7.08		1.01	
Vaneuse, Ark.....	13,512.44			13,512.44	6.74	25.44	1.00	8.71
Fidler, Miss.....	116,723.37	11,778.00	12,488.41	116,012.96	6.91	25.18	.92	3.47
Cottonwood, Miss.....	207,597.56		2,976.10	210,573.66	7.93	26.95	1.08	3.88
Vicksburg, Miss.....	69,726.34		18,412.17	51,314.17	11.07		1.49	
Reid-Bedford Bend, La.....	23,509.62		8,303.48	15,206.14	6.46		1.26	
Red Fork, Ark.....	54,880.38		14,324.00	40,556.38				

Location.	Work accomplished.		Total cost of work.	Gross unit cost. ¹		Remarks.
	Squares. ²	Linear feet. ³		Per square.	Per linear foot.	
Lake Bolivar, Miss.....	4,296	1,050	\$41,996.03	\$9.77	\$35.12	Total cost includes repairs amounting to \$5,112.06.
Ashbrook Neck, Miss.....			1,973.37			Clearing for next season's work.
Panther Forest, Ark.....	8,991	1,780	93,947.14	10.45	41.40	Total cost includes repairs amounting to \$20,254.92.
Greenville, Miss.....	5,635	1,070	47,717.27	8.47	36.95	Total cost includes repairs amounting to \$8,171.57.
Vaneuse, Ark.....	1,907		15,428.44	8.09		All scattering repairs.
Fidler, Miss.....	16,661	1,300	129,031.72	7.74	34.15	Total cost includes repairs amounting to \$84,627.82.
Cottonwood, Miss.....	29,354	8,060	230,943.83	7.83	28.65	New work.
Vicksburg, Miss.....	6,443	1,800	55,492.10	8.61	30.83	Do.
Reid-Bedford Bend, La.....	1,325		16,641.52	12.56		Work not completed.
Red Fork, Ark.....	5,870		45,337.53	7.72		Work in progress.

¹ Includes every item of field and overhead charges.

² Squares include both subaqueous and upper bank work.

³ Length of effective revetment gained.

II. LEVEES.

(a)-Upper Tensas Levee District.

Location.—Right bank of the river, from the Arkansas River, 402 miles below Cairo, to opposite Warrenton, Miss., 606 miles below Cairo.

Original condition.—By congressional act of September 25, 1850, all Government lands subject to overflow in Arkansas and Louisiana were donated to the State authorities to assist in building levees along this front. The first project adopted by the State authorities contemplated the construction of levees, with a crown width equal to their height, a base width equal to seven times their height, and a height such as to be 30 inches above the highest then known water.

With funds obtained from the sale of overflowed public lands donated to the States in 1850, a continuous line of levee was built from the Amos Bayou hills to the lower limits of the district. These levees were practically destroyed in the great flood of 1858, and but little levee work was undertaken between 1858 and 1882.

Previous project.—None.

Present project.—The present project was adopted by the commission in 1882. It has been modified from time to time, and at present contemplates the enlargement of the existing levee line in cooperation with State and local levee boards to a grade 3 feet above the deduced confined high water of 1912, and a

section having an 8-foot crown, a river slope of 3 to 1, a land slope of 3 to 1 from 8 feet below the crown, and thence a banquette, 20 feet wide for levees 10 to 13 feet high, 30 feet wide for levees 13 to 16 feet high, and 40 feet wide for levees higher than 16 feet, with a crown slope of 10 to 1.

Operations and results prior to the present year.—In 1882 all gaps were closed between Atherton, La., and the lower end of the district, and above Arkansas City, and by 1889 the line had been made continuous, but with very low grades and weak sections. The first extreme flood after closing all gaps occurred in 1890 and caused eight crevasses. These were all closed, but the floods of 1891, 1892, and 1893 caused, respectively, one, six, and five crevasses, all of which were subsequently closed. The flood of 1897 caused three crevasses, which were promptly closed, and the flood of 1903 one crevasse. The line successfully stood the floods of 1898, 1899, 1904, 1906, 1907, 1908, 1909, and 1911. The flood of 1912 caused two crevasses in the line. These were closed and the levee strengthened and the entire line withstood the flood of 1913. The Mississippi levees withstood the flood of 1916, but two crevasses occurred in the Arkansas River levees. The work of enlarging and improving the levees had been pushed as rapidly as funds provided by the United States and the local authorities would permit. Since 1882 the United States has placed, exclusive of what was placed the present year, 32,787,305 cubic yards. The length of the controlling levee line is 190.6 miles. The total expended for levee work, including construction and high-water protection work, amounts to \$7,634,232.75.

Operations and results during the year.—Work was continued on the enlargement to commission grade and section of the levee from station 756+35 to station 930 (530 R.), under contract with N. C. Williamson & Co., at the rate of 14.87 cents per cubic yard. Under this contract 256,985 cubic yards were placed during the year at a cost of \$33,997.83.

Work was continued on the enlargement to commission grade and section of the Arkansas River levee from station 0 to station 149 under oral agreement with John R. Scott, at the rate of 14 cents per cubic yard. Under this agreement 115,494 cubic yards were placed during the year at a cost of \$15,655.64.

Work was continued until February 28, 1917, on the enlargement to commission grade and section of the Arkansas River levee from station 149 to 500, under oral agreement with Reeve H. Hutchinson at the rate of 12 cents per cubic yard. On March 17 said Reeve H. Hutchinson was compelled, on account of financial difficulties, low price of work, and greatly increased cost of all kinds of supplies, to abandon the work. During the year 267,554 cubic yards of dirt was placed in the levee, at a cost of \$32,106.48.

On June 10, 1916, bids were opened for the closure of crevasses on the Arkansas River between stations 501+04 and 530+15 and stations 816+34 and 817+99. All bids being considered excessive were rejected and oral agreement thereupon was entered into with Massey & Wolchansky for the closure of the crevasses at the rate of 25 cents per cubic yard. On February 26, 1917, the closure of the crevasses was completed; 224,738 cubic yards of dirt having been placed at a cost of \$56,184.50.

On October 6, 1916, contract was entered into with Roach & Stansell for the enlargement to commission grade and section of the Arkansas River levee from station 530+15 to 743, at the following rates per cubic yard: Section 1, 17 cents; section 2, 21 cents; section 3, 28 cents; and section 4, 29 cents. A total of 141,083 cubic yards was placed in the levee under this contract during the year at a cost of \$21,585.69.

On September 15, 1916, bids were opened for constructing a new loop at Hagamans, La., between stations 1559+65 and 1610+05. All bids were rejected as excessive and bids then canvassed for a shorter loop, far enough back to insure a life of one year. This work was then let to Donaven & Daley for 23.4 cents per cubic yard and was completed on December 30; a total of 32,579 cubic yards having been placed at a cost of \$7,601.85. A Bucyrus drag-line excavator was then ordered for the larger work. Later in the season a number of the original bidders submitted new propositions for the construction of the loop originally advertised. The bid of Clark, Harris & Dulauey, for 19 cents, was accepted and contract entered into with them for the work. A total of 158,597 cubic yards was placed under this contract during the year at a total cost of \$27,119.09.

The average price of contract work let during the year was 23.2 cents per cubic yard.

A profile accompanies showing the actual grade that the levee line has reached, the project grade, and the elevation of recent extreme floods.

Total expenditures in this district amounted to \$194,807.18, of which amount \$182,069.93 was for new work and \$12,737.25 was for high-water work.

Condition at end of the year.—The total length of the levee line in this district is 190.6 miles, of which 171 miles is along the Mississippi River and 19.6 miles along the Arkansas River, all of which is of sufficient height and section to protect the country behind it from moderate, and, in fact, all but the most extreme, floods. Only 10.8 miles of this line, however, is now completed to commission grade and section, which is the minimum section that can be depended upon to safely resist the extreme floods. To complete the line to this project grade and section will require the placing of approximately 24,762,812 cubic yards, of which 20,034,377 cubic yards is required in the levees along the Mississippi and 4,728,435 cubic yards in the levees along the Arkansas.

Local cooperation.—The expenditures by local levee boards prior to and during the last calendar year are shown in the following table:

Name.	From 1882 to Dec. 31, 1915.	During calendar year 1916.	Total to Dec. 31, 1916.
Red Fork levee district, Arkansas.....	\$184,940.82	\$108,000.00	\$292,940.82
Delta levee district, Arkansas.....	214,034.79	14,000.00	228,034.79
Chicot levee district, Arkansas.....	581,860.89	40,000.00	621,860.89
Cypress Creek drainage district, Arkansas.....			709.32
The State of Louisiana, Tensas Basin levee district, and fifth Louisiana levee district, Louisiana.....	7,053,785.37	229,221.98	7,283,007.35
Total.....	8,034,621.87	391,221.98	8,426,553.17

Proposed operations.—Work under way on Arkansas River Levee, stations 0 to 500, and on the Mississippi River Levees, stations 756+35 southward, and on the Hagaman Loop will be continued; the new levee machine will be out in operation if funds permit, and such other work of enlargement as existing funds or future appropriations permit will be undertaken.

Effect of improvement.—An area of 2,500 square miles has been completely protected from overflow, and 500 square miles additional are protected from all ordinary floods.

(b) Lower Yazoo Levee district.

Location.—Left bank of river from the Coahoma-Bolivar County line, 365 miles below Cairo to mouth of the Yazoo River diversion canal, 599 miles below Cairo.

Original condition.—Prior to 1882 the local levee board had constructed a continuous line of levee along this front from the upper end to Eagle Lake, 24 miles above the mouth of the Yazoo River. The extreme flood of 1882 destroyed many miles of this line.

Previous projects.—None.

Present project.—The same as specified for the Upper Tensas Levee district. (See II (a).)

Operations and results prior to the present year.—The series of floods of 1882, 1883, and 1884 prevented the successful closure of the gaps and the repair of levees. From 1885 to 1889 all gaps were closed, and the line withstood the three moderate floods of 1886, 1887, and 1888. The flood of 1890 caused seven crevasses, which were promptly closed, and the flood of 1891 caused one crevasse, which was closed. The line withstood the extreme floods of 1892 and 1893. The flood of 1897 caused five crevasses, which were closed. The floods of 1898 and 1899 were successfully held. In 1903 two crevasses occurred below Greenville, which overflowed less than half of the Yazoo Basin. These crevasses were closed, and the floods of 1904, 1906, 1907, 1908, 1909, and 1911 did not breach the line. In 1912 one crevasse occurred at Beulah, 40 miles below the head of the district, which was not closed in time to hold the first freshet of 1913. This gap was closed with a pile and rock dike in time to withstand the main 1913 flood. One crevasse occurred however at Skipwith, 55 miles above the lower end of the district, during the 1913 flood. The line withstood the record flood of 1916. In addition to closing crevasses since 1882, the commission has also enlarged and strengthened the existing line in so far as funds permitted. Since 1882 the United States has placed 28,104,006 cubic yards along its front, and has expended, including high-water protection and maintenance, \$37,363.83.

Operations and results during the present year.—Work was continued on the enlargement of the Lake Beulah Levee, stations 2050–2130 (404 L.), under contract with R. T. Clark & Co. Under this contract 2,219 cubic yards were placed during the year. This work merely repaired two sloughs in the levee. The unit price of this work was 21.8 cents per cubic yard. The total cost of work during the year was \$435.37.

Work was continued on the enlargement of the levee, stations 1167 to 1567+33 (495–502 L.) below Greenville, under contract with Bondurant, Callahan, Gheshire & Co., 163,156 cubic yards having been placed during the year at a total cost of \$20,530.47, bringing 15,900 feet of levee to full grade and section. The unit price of work under this contract is 14.34 cents per cubic yard.

Work was continued on the enlargement of the levee from station 1800 to 2100 (509–514 L.), below Greenville, under contract with the H. B. Blanks Levee Co., at 12.24 cents per cubic yard. During the year 318,812 cubic yards were placed at a total cost of \$35,896.99. This completed the enlargement from station 1853 to station 2097.

Work on the enlargement of the levee from station 0 to station 520 was continued with the Government levee machine throughout the year. During the year 84,724 cubic yards were placed at a field cost of \$25,343.96 (29.7 cents per cubic yard), which completed the levee down to station 123.

Work was continued under contract with Walter H. Denison for the enlargement to commission grade and section of the levee from stations 1850 to 2050 (402 L.), at 14.37 cents per cubic yard. During the year a total of 299,020 cubic yards was placed under this contract at a total cost of \$37,634.46, completing the enlargement between stations 1900 and 2050.

In September and October, 1916, contracts were entered into with the following firms for the construction of a new loop at Cottonwood, Miss., between stations 8394+80 and 8473+47 (558 L.) for the prices indicated:

Name of firm.	Section.	Stations.	Price.
R. T. Clark & Co.....	1	8394+80–8417.....	<i>Crate.</i> 26.4
Do.....	2	8417–8436.....	28.9
W. T. & E. M. Lowrance & Co. and R. P. Harris.....	3	8436–8450.....	40
Roach & Stansell.....	4	8450–8473+47.....	29.7

Work was completed on December 30, 1916, 606,462 cubic yards having been placed at a total cost of \$189,396.40.

On January 5, 1917, hired teams were put to work on the sinking levee across Clear Creek, near Beulah, stations 2073 to 2080, and placed 2,477 cubic yards of material at a total cost of \$1,525.11, bringing the sinking section again up to grade.

The average price of contract work during the year was 31.25 cents per cubic yard.

The total expenditures in this district during the year amounted to \$357,609.58, of which amount \$344,872.33 was for new work and \$12,737.25 was for high-water protection work.

Condition at end of the present year.—The length of the levee line is 185.2 miles, all of which is of sufficient height and section to protect the land behind it from moderate and, in fact, all but the extreme floods. Only 14.6 miles, however, have been brought up to full project grade and section, which is the minimum that can be depended upon to resist extreme floods. To bring the line up to this grade and section will require approximately 33,773.263 cubic yards.

A profile showing the actual grade that the levee line has reached, the project grade, and the elevations of recent extreme floods accompanies this report.

Local cooperation.—The expenditures by the Board of Mississippi Levee Commissioners, the only local levee board interested in the maintenance of this levee line, are shown by the following statement:

Expended from 1882 to Dec. 31, 1915.....	\$14,661,887.08
Expended during calendar year 1916.....	580,874.13

Total to Dec. 31, 1916.....	15,242,761.21
-----------------------------	---------------

Proposed operations.—The enlargement from station 0 to 520 at the head of the district by operating the levee machine with hired labor will be continued. The contracts in progress: At Beulah, stations 1850 to 2050 and 2050 to 2130; beside to Stella, stations 1167 to 1567+33; and the Damascus to Princeton work, stations 1800 to 2100 will be completed. Such additional enlargement work will be undertaken as available funds permit.

Effect of the improvement.—An area of 3,367 square miles has been protected from overflow.

Data concerning levee yardage in third Mississippi River district.

Levee district.	In system.	Built.	Contents, 1916.	Built since by—		Total built since 1916.
				United States.	Local authorities.	
	<i>Miles.</i>	<i>Miles.</i>	<i>Cubic yards.</i>	<i>Cubic yards.</i>	<i>Cubic yards.</i>	<i>Cubic yards.</i>
Lower Yazoo.....	206.30	185.2	51,836,527	¹ 1,371,564	² 896,423	2,267,987
Upper Yazoo.....	192.0	190.6	48,726,244	1,070,219	1,527,964	2,598,183

Levee district.	Lost or abandoned during year.	Contents, 1917.	Required to complete.	Estimated final contents.	Per cent now built.	Approximate area protected.
	<i>Cubic yards.</i>	<i>Cubic yards.</i>	<i>Cubic yards.</i>	<i>Cubic yards.</i>		<i>Square miles.</i>
Lower Yazoo.....	833,000	53,271,514	33,773,263	87,044,777	61.2	3,367
Upper Yazoo.....	220,000	51,104,427	24,762,817	75,867,244	67.3	2,500

¹ 422,670 cubic yards Ashbrook Dike not included.

² 263,387 cubic yards of sublevees not included.

³ Arkansas River levees from Red Fork to the Lincoln-Jefferson County line not included in above

Cubic yards.

Estimated yardage in place (built by local authorities).....	2,958,047
Estimated yardage required to complete.....	4,539,872

Cost of levees in third district built by machines.

Machine and location.	Mobilization.	Clearing.	Drainage.	Plowing.	Operation.	Repairs.	Dressing.	Seeding.
Levee machine No. 1, at upper end of district.....		\$589.18	\$489.79	\$129.15	\$16,006.35	\$4,427.78	\$676.50	\$79.15
Lower end of district.....								
At Beulah and Bourbon Ashbrook Dike.....	\$2,612.10	197.55	51.32	.....	11,505.40	705.99	1,634.31	79.40

Machine and location.	Care.	Surveys.	Depreciation. ¹	Overhead.	Total cost.	Yardage handled.	Cost per cubic yard.
Levee machine No. 1, at upper end of district.....	\$2,264.26	.....	\$4,560.00	\$2,946.06	\$32,168.12	84,724	Cents. 26.3
Lower end of district.....							
At Beulah and Bourbon Ashbrook Dike.....	2,033.07	\$216.00	16,517.20	1,526.13	37,078.47	381,850	10.2

Depreciation of plant is fixed at 20 per cent per annum.

III. SURVEYS.

(a) *Revetment surveys.*

Topographic surveys were made over all revetments, between August 8 and August 7, 1916. The information obtained from these surveys is incorporated in several paragraphs relating to condition of revetments.

In these surveys the original base lines, run out in order to accurately locate the mats placed, and certain fixed ranges, usually 200 feet apart, were retraced. Soundings were taken on the ranges thus located; shore lines were run along and below the revetments as far as active caving was encountered, and soundings were taken on ranges 1,000 to 1,500 feet apart within these reaches.

(b) *Reach and bank line surveys.*

Surveys were also made in the following reaches: Dennis (372 L.), Wax (393 L.), Riverton (400 L.), Caulks Neck (409 R.), Arkansas City (439 L.), Millers Bend (459 L.), Lake Jackson (511 L.), Stack Island Chute (540 L.), Promised Land (546 L.), Cottonwood (558 L.), Brunswick (573 L.), Henderson (573 R.), and Millikens Bend (583 R.).

These surveys indicate that caving is in progress in all reaches surveyed and that new levee loops or revetments will be necessary in the immediate future at the following points:

Princeton (514 L.), stations 2097-2123.

Haggaman (542 R.), stations 1560-1614.

Shiloh (555 L.), stations 8420-8470.

Angle near Brunswick (574 L.), stations 5200-5260.

Henderson (573 R.), stations 2840-3000.

Millikens Bend (583 R.), stations 3076-3149; (585 R.), stations 3301.

Near Delta, La. (598 R.), stations 4195-4210.

In these surveys the bank line was meandered, and where necessary soundings were taken on ranges 1,000 to 1,500 feet apart.

IV. PLANT.

The following items of plant were added during the year:

The steam tug *Sidney C.*, and the gasoline launch *Carroll* were purchased from private parties. A barge specially designed for laying concrete revetment was constructed and machinery installed by day labor. Machinery for concrete mixer plants was purchased and installed on barges already on hand.

Twelve creosoted wood material barges are being constructed, nine of which have been completed and put in service. The remaining three have been creosoted and framed complete ready for erection at the United States fleet. Bui derrick No. 1309 was repaired and rebuilt on barge No. 071.

Two additional floating concrete mixing plants, one concrete mixing chuting tower barge, and one additional barge for laying concrete revetment have been authorized and work on them has commenced, to be continued by hired labor at the United States fleet.

A shop building was constructed on shore, and the machine, blacksmith, tin shops moved into same.

General repairs were made to plant during the year and plant was cared for during the lay-up season.

The total expenditures were as follows:

New plant.....	\$122, 78
Repairs to plant.....	37, 00
Care of plant.....	12, 81
Total.....	173, 19

The following table shows the cost of new plant built or purchased during the year, June 1, 1916, to May 31, 1917:

Name or number.	Cost.	How obtained.
Bay Sydney C.	\$7,736.00	Purchased from private parties.
Bay No. launch Carroll	2,400.00	Do.
Concrete mat barge No. 1908 ..	18,968.05	Built by hired labor at United States fleet.
Mat No. 071	3,132.72	Burned derrick No. 1309 rebuilt on barge 071.
Concrete mixers and derricks:		
No. 072	7,343.18	Machinery and bins installed at United States fleet on mat barge No. 072. Not completed.
No. 1709	481.49	Machinery and bins installed at United States fleet on mat barge No. 1709.
Boiler and tower No. 1509	8,499.00	Machinery, tower, and bins installed at United States fleet on mat barge No. 1509.
Portable grader No. 1014	19,684.96	Cabin built and machinery installed at United States fleet on barge No. 1014.
Boat shop building	8,053.67	Built by hired labor on United States property. Not complete.
New barges	46,128.78	Built by hired labor at United States fleet. Not complete.
.....	360.67	Built by hired labor at United States fleet.
Total	122,782.61	

The following table shows the cost of repair work done on plant during the year June 1, 1916, to May 31, 1917:

Name or number.	Cost.	Work done.
Boat:		
Control	\$4,647.36	Docked: new floor timbers in bottom, 60 per cent new planking on bottom; new transom, cylinder timbers, and wheel; machinery thoroughly overhauled; minor repairs made during year as needed.
Arthur Hider	1,920.45	Repairs to both fantails; new plank sheer; repairs to wheel; machinery overhauled; minor repairs made during the year as needed.
W. S. I. Coppee	2,980.20	Renewed portions of plank sheer; new breechings and stacks; new flues in main boilers; machinery overhauled; minor repairs made during year as needed.
Yampou	2,652.47	New rudder stocks, rudders repaired; new pillow blocks; hull repaired; machinery overhauled; minor repairs made during year as needed.
Bay Sydney C.	1,652.42	Steam capstan installed; docked; hull sand blasted and coated with coal-tar pitch; new cylinder castings; machinery overhauled; new furnace; minor repairs made during year as needed.
White Water	1,802.38	2 new sheets in top strake; corroded frames renewed and resurfaced; machinery overhauled; minor repairs made during year as needed.
Boat	474.55	Repairs to coal bin, pipes, yawls, and minor repairs during the year as needed.
Boat	106.92	Work on hull, and docking; dismantling; minor repairs to keep afloat.
Boat grinders:		
No. 101	1,466.02	Repairs to and repainting cabin; overhauling main pumps; minor repairs during year as needed.
No. 222	1,406.01	Repairs to feed pump, pipes, and boiler; minor repairs during year as needed.
No. 262	426.26	Repairs to feed pump, pipes, and boiler; minor repairs during year as needed.
Boat boats:		
No. 063	13.60	Minor repairs to machinery.
No. 379	51.75	Repairing deck, piping, wells, etc.
No. 1209	365.75	Docked; repairing and calking hull; building lockers; work on machinery.
No. 1211	329.78	Do.
No. 1213	108.06	Repairing machinery, derrick irons, shaft, etc.
No. 1214	269.80	Calking; work on machinery, derrick, etc.; minor repairs during year as needed.
Boat shop No. 079	99.55	Repairs to boiler and machinery; calking; minor repairs during year as needed.
Boat shop No. 222	1,456.87	Raised and docked; hull sheathed to water line. Machinery replaced; minor repairs made during year as needed.
Boat boats:		
No. 155	452.11	
No. 156	496.57	Docked; hulls repaired and calked; deck on guards; cabins screened and roofs repaired; new pits for ranges, and piping overhauled.
No. 157	381.24	
No. 159	417.71	
No. 1107	11.83	Repairs, calking, etc.
No. 1201	122.66	Replacing broken glass; screening; building lockers.

3588 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Name or number.	Cost.	Work done.
Quarter boats—Continued.		
No. 1202.....	\$9.75	Stovepipe on range.
No. 1307.....	12.32	Minor repairs.
No. 1308.....	3.60	Building screen doors.
No. 1513.....	26.55	Repairing doors; screening; work on pumps.
No. 1507.....	15.74	Repairing screens.
No. 1010.....	944.45	Docked; hulls repaired and calked all over; cabins repaired and painted; forecastle upper deck screened; all screens and doors repaired.
No. 31.....	799.43	Repairs to roof.
No. 1108.....	18.78	Repairing doors, windows, roof, and cabin.
No. 1308.....	145.15	Fatching deck.
No. 553.....	1.90	
Mat boats:		
No. 089.....	24.05	Minor repairs.
No. 0810.....	31.17	Do.
No. 1134.....	393.38	Repairs to deck; calking; lengthening skids.
No. 1135.....	418.56	Do.
No. 1136.....	1,179.88	Renewing main and apron decks complete with creosoted lumber; repairing stanchions and skids.
No. 1137.....	1,317.54	
Barges:		
No. 07X.....	53.16	Renewing timber heads; calking sides.
No. 073.....	86.27	Do.
No. 077.....	373.36	Building hatch; repairing deck, timber heads, and calking sides.
No. 078.....	59.50	Renewing timber heads and calking sides.
No. 082.....	200.10	Docking; renewing timber heads; calking sides.
No. 084.....	45.10	Docked; sides calked; planing repaired.
No. 6 (line).....	98.24	Calking sides, putting in timber heads, calking, repairing hull, deck, etc.
No. 103.....	4.65	Minor repairs and calking.
No. 104.....	46.65	Do.
No. 106.....	38.50	Timber heads; repaired capstan; calked; minor repairs.
No. 108.....	5.90	Minor repairs.
No. 564.....	29.13	Putting in timber heads and hatch covers.
No. 508.....	66.46	Repairs to deck; calking; renewing timber heads.
No. 572.....	270.22	Repairing rakes, spuds, and building horses.
No. 575.....	43.06	Repairing deck and calking sides.
No. 579.....	38.45	Do.
No. 581.....	442.98	Docked; changed to brush-loading barge; repaired bottom and deck; calked all over; spuds installed.
No. 584.....	491.01	Work on deck.
No. 583.....	1.40	Repairs to deck and sides; calked all over; renewing timber heads.
No. 582.....	409.61	Building hatch covers.
No. 585.....	6.31	Docked; bottom and sides repaired and calked; renewed apron and timber heads.
No. 586.....	250.28	Deck repaired; hatches built.
No. 587.....	192.31	Docked; sides and bottom repaired and calked; deck and timber heads repaired.
No. 589.....	397.53	Calking sides and rake.
No. 1101.....	8.78	Minor repairs.
No. 1102.....	3.60	Installing gravel bins, calking, etc.
No. 1103 (scow).....	84.79	Repairing gravel bins; calking.
No. 1105 (scow).....	10.20	Sides calked.
No. 1106.....	12.00	Docked; sand blasted and coated with pitch.
No. 1204.....	391.23	Do.
No. 1207.....	210.51	Gravel bins installed; sand blasted; painted.
No. 1209.....	50.53	Docked; sand blasted and coated with pitch.
No. 1301.....	134.50	Gravel bins built; deck and sides scraped and painted.
No. 1303.....	122.17	Scraped and painted deck and sides.
No. 1304.....	75.99	Docked; sand blasted and coated with pitch.
No. 1305.....	199.91	Do.
No. 1306.....	184.52	Docked; hole in rake repaired.
No. 1310.....	48.18	Docked; bottom repaired and calked.
No. 1401.....	67.23	
No. 1403 (scow).....	11.20	
No. 1404 (scow).....	8.00	
No. 1502.....	2.00	Minor repairs and calking.
No. 1503.....	45.58	
No. 1505.....	109.57	Installing traveler and track and converting into mooring barges for use in sinking subaqueous concrete mats.
No. 1507.....	149.92	
No. 1510.....	107.99	Minor repairs and calking.
No. 1512.....	5.19	
No. 1208.....	57.01	Installing bins to convert into gravel barges.
No. 1604.....	57.01	
Dry dock, No. 1015.....	35.30	Renewing blocks; minor repairs.
Gasoline launch, Chicot.....	1,989.97	Installing new engine; overhauling hull and interior fittings.
Gas boats:		
No. 2.....	10.60	Minor repairs to engine.
No. 3.....	74.60	Repairing hull, engine, and rudder.
Carroll.....	152.10	Repairs to engine and hull.
Total.....	37,601.04	

V. HIGH-WATER WORK.

To guard against possible danger to the levee system from high water arrangements were made early in April for the distribution of plant and assistants throughout the district so as to render prompt assistance in case of trouble. A system of patrols was also inaugurated for the purpose of guarding the line during day and night for a few days previous to and following the crest of the flood.

No trouble was experienced at any point in the district except on the new Ashbrook Dike, constructed during the past season, where considerable damage was done at the lower end of the dike.

J. R. SLATTERY,

Major, Corps of Engineers, U. S. A.

Abstract of contracts in force for the year ended June 30, 1917.

Contractor.	Date of—		Date fixed for—		Amount and character of work or materials.				Unit price.	Per cent completed.	
	Contract.	Approval.	Commencement.	Completion.	Yardage.	Stations.	Miles.	Levee.			
<i>Levee work in Lower Yazoo levee district.</i>											
Walter H. Denison.....	June 15, 1915	June 23, 1915	July 13, 1915	Dec. 1, 1916 ¹	743,000	1850-2050	402 L.	Lake Beulah.....	<i>Cords.</i> 14.37	93	
R. T. Clark & Co.....	Nov. 13, 1914	Nov. 27, 1914	Dec. 17, 1914	.....do. ¹	139,116	2090-2130	404 L.	Beulah Crevasse.....	21.8	71
Bondurant, Callahan, Cheshire & Co.	Dec. 26, 1914	Jan. 7, 1915	Jan. 24, 1915	.....do. ¹	1,249,000	1167-1567+33	495-502 L.	Wayside-Stella.....	14.34	58
The H. B. Blanks Levee Co.....	Jan. 11, 1915	Jan. 18, 1915	Feb. 5, 1915	.....do. ¹	725,000	1800-2100	506-514 L.	Damascus-Princeton	12.25	81
<i>Levee work in Upper Tennessee levee district.</i>											
Rosch & Stansell.....	Oct. 6, 1916	Oct. 18, 1916	Nov. 3, 1916	Dec. 1, 1919	680,000	530+15-743 530+15-592 592-640	Arkansas River enlargement. Section 1..... Section 2.....	.....	17	29
H. C. Williamson & Co.....	June 29, 1915	July 10, 1915	July 22, 1915	Dec. 1, 1916 ¹	494,989	640-690 690-743	Section 3..... Section 4.....	.....	21 23	.....
Clark, Harris & Dulaney.....	Jan. 15, 1917	Jan. 26, 1917	Feb. 13, 1917	Dec. 1, 1917	528,000	756+35-830	530 R.	Opossum-Wilson Point. Hagaman new levee.	14.87 19	96 45	
<i>Willows for reclamation work.</i>											
Tennessee Contracting Co.....	Jan. 15, 1915	Jan. 13, 1915	Indeterminate	Cutting privilege on lands owned or controlled by the contractor.					<i>Cord.</i> 10	(¹)
<i>Riprap stone.</i>											
Foster & Creighton Co.....	May 19, 1915	June 3, 1915	When notified ²	25,000 short tons, more or less, at quarries in Alabama.					435	45
United States Stone Co.....	Sept. 21, 1916	Oct. 6, 1916do. ³	20,000 short tons of stone on river bank at Arkansas City, Ark.					477.5	90
<i>Lease of land.</i>											
The Y. & M. V. R. Co.....	Nov. 2, 1914	(¹)	Lease of strip of land bordering third district repair yard, Vicksburg, Miss.					(¹)

¹ Time limit waived.
² Per cord.

³ Indeterminate.
⁴ Per ton.

⁵ Not subject to approval.
⁶ \$374 for first year; \$24 per annum thereafter.

FINANCIAL STATEMENTS—THIRD DISTRICT.

Appropriation for maintenance and improvement of existing river and harbor works, act Oct. 2, 1914.

REPAIRS TO EXISTING WORKS AND STONE.

July 1, 1916, balance unexpended	\$9,787.45
Reimbursed by other engineer districts	315.66
	<hr/>
June 30, 1917, expended during fiscal year	10,103.11
	<hr/>

UPPER TENSAS LEVEE DISTRICT.

July 1, 1916, balance unexpended	231,654.31
June 30, 1917, expended during fiscal year	51,635.86
	<hr/>
July 1, 1917, balance unexpended	180,018.45
July 1, 1917, outstanding liabilities	15,093.53
	<hr/>
July 1, 1917, balance available	164,924.92

LOWER YAZOO LEVEE DISTRICT.

July 1, 1916, balance unexpended	166,387.97
Collection of overpayment made in January, 1916	1.00
	<hr/>
June 30, 1917, expended during fiscal year	166,388.97
	<hr/>
July 1, 1917, balance unexpended	54,941.35
July 1, 1917, amount covered by uncompleted contracts	111,447.62
	<hr/>

Appropriation for maintenance and improvement of existing river and harbor works, act Mar. 4, 1915.

LAKE BOLIVAR FRONT, MISS.

July 1, 1916, balance unexpended	\$7,853.00
June 30, 1917, expended during fiscal year	7,853.00

ASHBROOK NECK, MISS.

July 1, 1916, balance unexpended	37,941.74
June 30, 1917, expended during fiscal year	11,166.91
	<hr/>
July 1, 1917, balance unexpended	26,774.83
July 1, 1917, outstanding liabilities	\$17,044.11
July 1, 1917, amount covered by uncompleted contracts	8,327.89
	<hr/>
July 1, 1917, balance available	25,372.00
	<hr/>
July 1, 1917, balance available	1,402.83

PANTHER FOREST, ARK.

July 1, 1916, balance unexpended	42,980.21
Collection of overpayment made in January, 1916	.20
	<hr/>
June 30, 1917, expended during fiscal year	42,980.41
	<hr/>

GREENVILLE, MISS.

July 1, 1916, balance unexpended	39,614.75
Collection of overpayment made in January, 1916	1.00
	<hr/>
June 30, 1917, expended during fiscal year	39,615.75
	<hr/>

3592 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

GRAND LAKE, ARK.

July 1, 1916, balance unexpended.....	\$3, 6
Collection of overpayment made in January, 1916.....	
June 30, 1917, expended during fiscal year.....	3, 6

FITLERS BEND, MISS.

July 1, 1916, balance unexpended.....	50, 9
June 30, 1917, expended during fiscal year.....	50, 9

REPAIRS TO EXISTING WORKS AND STONE.

July 1, 1916, balance unexpended.....	25, 0
June 30, 1917, expended during fiscal year.....	25, 0

EXPERIMENTAL REVETMENT.

July 1, 1916, balance unexpended.....	11
June 30, 1917, expended during fiscal year.....	11

ASHBROOK DIKE, MISS.

July 1, 1916, balance unexpended.....	106. 46
June 30, 1917, expended during fiscal year.....	106. 46

UPPER TENSAS LEVEE DISTRICT.

July 1, 1916, balance unexpended.....	125. 23
Receipts from sales.....	6. 30
June 30, 1917, expended during fiscal year.....	131. 53
July 1, 1917, balance unexpended.....	97. 03
July 1, 1917, balance unexpended.....	34. 50
July 1, 1917, amount covered by uncompleted contracts.....	11. 20
July 1, 1917, balance available.....	23. 29

LOWER YAZOO LEVEE DISTRICT.

July 1, 1916, balance unexpended.....	71, 716
Receipts from sales.....	6, 300
June 30, 1917, expended during fiscal year.....	78, 016
July 1, 1917, balance unexpended.....	70, 396
July 1, 1917, balance unexpended.....	7, 620
July 1, 1917, amount covered by uncompleted contracts.....	7, 620

SURVEYS, THIRD DISTRICT.

July 1, 1916, balance unexpended.....	4, 964
June 30, 1917, expended during fiscal year.....	2, 416
July 1, 1917, balance unexpended.....	2, 548
July 1, 1917, outstanding liabilities.....	487.
July 1, 1917, balance available.....	2, 061

¹ On account of transfer of a steel barge built from this allotment to the fourth Mississippi River district and by authority of the Chief of Engineers (E. D. 71814/248), expenditures for Ashbrook Dike were decreased \$21,075.90 and the expenditures for Atchafalaya levee district correspondingly increased. With this adjustment, the expenditure should be \$85,423.73.

PLANT, THIRD DISTRICT.

July 1, 1916, balance unexpended	\$0, 841. 86
Receipts from sales	2, 125. 55
Collection of overpayment made in May, 1916	. 50
	<hr/>
	11, 967. 91
June 30, 1917, expended during fiscal year	11, 967. 91

Appropriation for improving Yazoo River and tributaries, Miss.

YAZOO RIVER, AT MOUTH.

July 1, 1916, balance unexpended	\$14, 722. 52
Oct. 9, 1916, transferred to Engineer Department (Vicksburg, Miss. district), under provision of river and harbor act of July 27, 1916	14, 722. 52

Appropriation for Mississippi River, river and harbor act July 27, 1916.

LAKE BOLIVAR FRONT, MISS.

Aug. 14, 1916, approved allotment	\$90, 000. 00
June 30, 1917, expended during fiscal year	\$26, 137. 55
Transferred to "Repairs to existing works and stone"	60, 000. 00
	<hr/>
	86, 137. 55
July 1, 1917, balance unexpended and available	3, 862. 45

ASHBROOK NECK, MISS.

Aug. 14, 1916, approved allotment	60, 000. 00
June 30, 1917, expended during fiscal year	\$1, 654. 38
Transferred to "Upper Tensas levee district"	20, 000. 00
	<hr/>
	21, 654. 38
July 1, 1917, balance unexpended and available	38, 345. 62

PANTHER FOREST, ARK.

Aug. 14, 1916, approved allotment	70, 000. 00
June 30, 1917, expended during fiscal year	43, 876. 06
July 1, 1917, balance unexpended	26, 623. 94
July 1, 1917, outstanding liabilities	4, 380. 53
	<hr/>
July 1, 1917, balance available	22, 243. 41

FITLERS BEND, MISS.

Aug. 14, 1916, approved allotment	9, 000. 00
Incurred by other engineer districts	192. 26
	<hr/>
	9, 192. 26
June 30, 1917, expended during fiscal year	9, 000. 00
July 1, 1917, balance unexpended and available	192. 26

REPAIRS TO EXISTING WORKS AND STONE.

Aug. 14, 1916, approved allotment	60, 000. 00
Transferred from "Lake Bolivar front"	60, 000. 00
	<hr/>
	120, 000. 00
June 30, 1917, expended during fiscal year	\$54, 033. 83
Transferred to "Plant, third district"	20, 000. 00
	<hr/>
	74, 033. 83
July 1, 1917, balance unexpended	45, 966. 17
July 1, 1917, outstanding liabilities	13, 897. 32
	<hr/>
July 1, 1917, balance available	32, 068. 85

3594 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

ASHBROOK DIKE, MISS.

Aug. 14, 1916, approved allotment		\$232,000.00
June 30, 1917, expended during fiscal year	\$97,873.13	
Transferred to "Upper Tensas Levee District"	20,000.00	
		117,873.13
July 1, 1917, balance unexpended		114,828.88
July 1, 1917, outstanding liabilities		31,283.88
July 1, 1917, balance available		83,043.00

UPPER TENSAS LEVEE DISTRICT.

Aug. 14, 1916, approved allotment		373,000.00
Receipts from sales		
Transferred from "Ashbrook Dike, Miss."	20,000.00	
Transferred from "Ashbrook Neck, Miss."	20,000.00	
Transferred from "Cottonwood, Miss."	20,000.00	
		433,000.00
June 30, 1917, expended during fiscal year	\$80,551.70	
Transferred to "Lower Yazoo levee district"	49,000.00	
		129,551.70
July 1, 1917, balance unexpended		303,449.00
July 1, 1917, outstanding liabilities	57,566.15	
July 1, 1917, amount covered by uncompleted contracts	206,851.72	
		264,417.87
July 1, 1917, balance available		39,031.13

LOWER YAZOO LEVEE DISTRICT.

Aug. 14, 1916, approved allotment		300,000.00
Transferred from "Upper Tensas levee district"	49,000.00	
		349,000.00
June 30, 1917, expended during fiscal year		244,379.88
July 1, 1917, balance unexpended		104,620.00
July 1, 1917, outstanding liabilities	\$2,387.43	
July 1, 1917, amount covered by uncompleted contracts	21,073.94	
		23,461.37
July 1, 1917, balance available		81,158.63

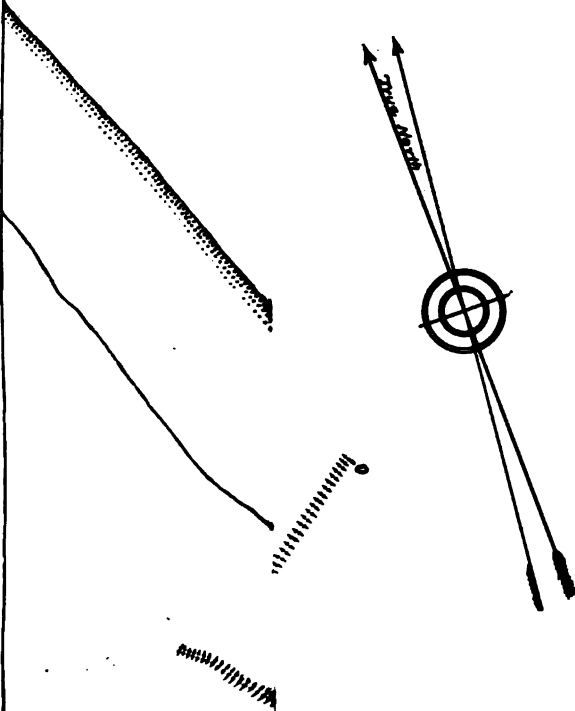
SURVEYS, THIRD DISTRICT.

Aug. 14, 1916, approved allotment		5,000.00
July 1, 1917, balance unexpended and available		5,000.00

PLANT, THIRD DISTRICT.

Aug. 14, 1916, approved allotment		266,000.00
Receipts from sales		127.11
Transferred from "Repairs to existing works and stone"	20,000.00	
Reimbursed by other engineer districts		316.77
		286,443.88
June 30, 1917, expended during fiscal year		211,614.94
July 1, 1917, balance unexpended		74,828.94
July 1, 1917, outstanding liabilities	\$62,542.26	
July 1, 1917, amount covered by uncompleted contracts	24.00	
		62,566.26
July 1, 1917, balance available		12,262.68

PLATE NO. 2.



ARK.

MISSISSIPPI RIVER COMMISSION

Third District

RED FORK REVETMENT

ARKANSAS RIVER

Prepared under the direction of

J. R. SLATTERY, Corps of Engineers, U.S.A.

SCALES OF FEET

Horizontal

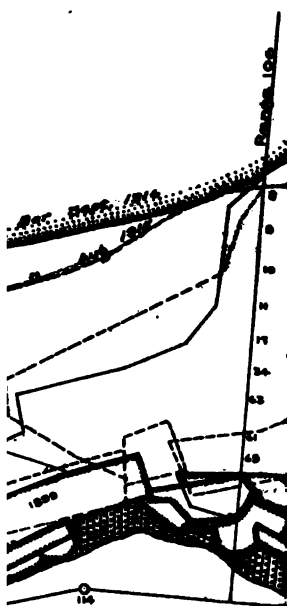
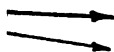
200 1000 2000 Ft.

Vertical

10 20 30 40 50 60 70 80 90 100 Ft.

Soundings reduced to 155.3 ft. Memphis Datum
Survey of Feb. 1897 *C.F.B.* Chief of Party
Traced May 1897 by *C.F.B.*

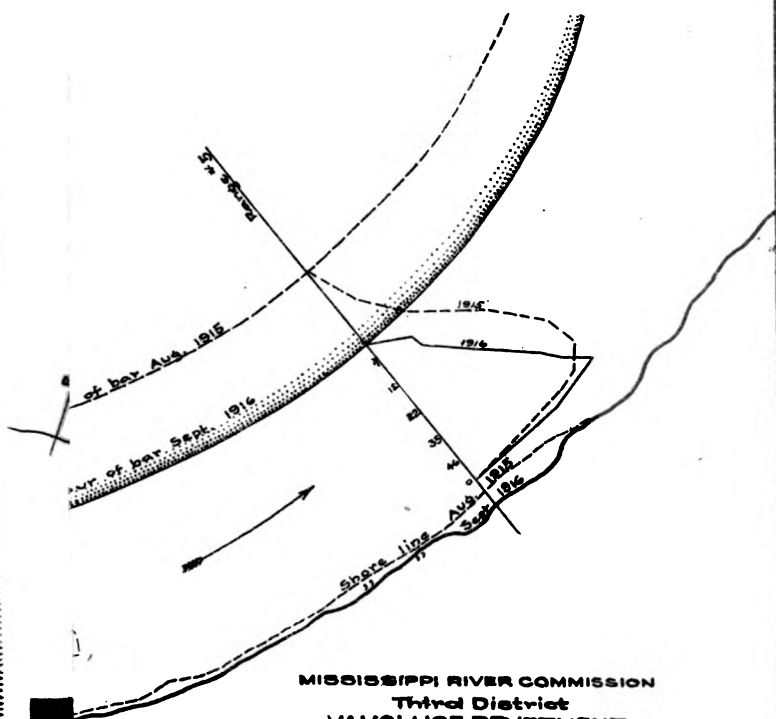
To go
Floor



Vicksburg, Miss
To accompany Annual Re
Fiscal Year ending June

J. R. [Signature]

Major, Corps of Eng



MISSISSIPPI RIVER COMMISSION

Third District

VAUCLUSE REVETMENT

428-428 M.S.C.

Prepared under the direction of

Major J. R. SLATTERY, Corps of Engineers, U.S.A.

SCALES OF FEET

Horizontal 0 200 400 600 800 Ft.

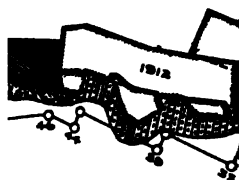
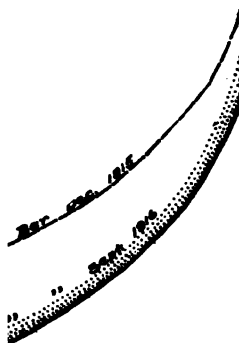
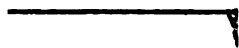
Vertical 0 10 20 30 40 50 60 70 80 90 100 Ft.

Soundings reduced to Zero of Greenville Gage.

Survey of September 1916 by Chief of Party

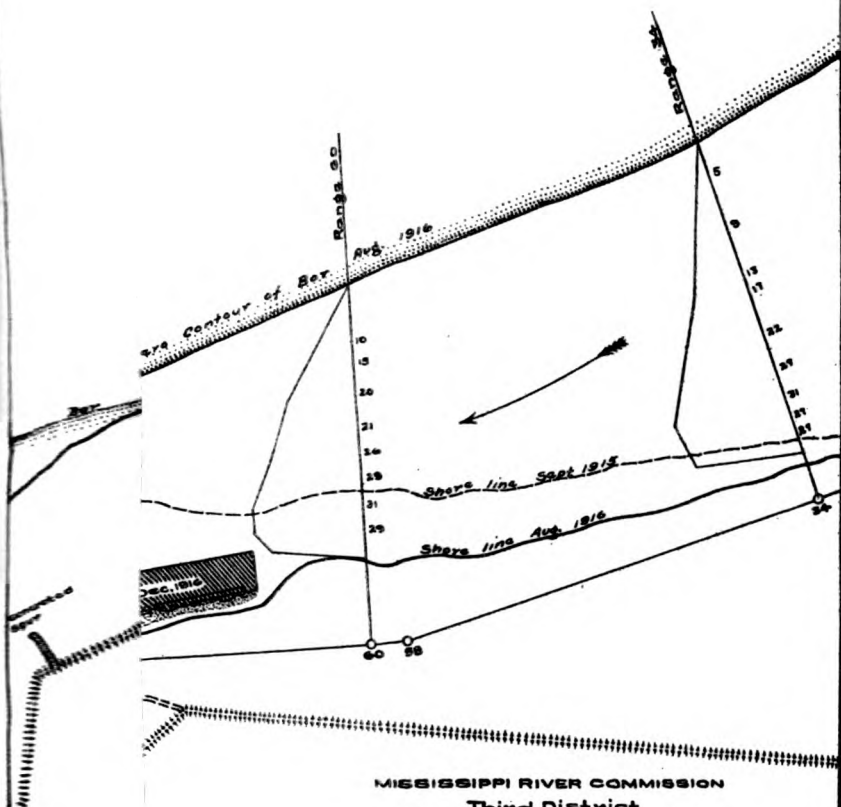
Traced April 1917 by C. J. R.

U.S. Army.



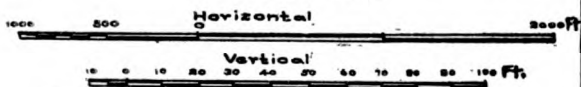
—
//
—

PLATE NO 8



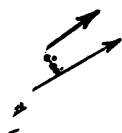
MISSISSIPPI RIVER COMMISSION
 Third District
 COTTONWOOD REVETMENT
 555-557 M.B.C.
 Prepared under the direction of
 Major J. R. SLATTERY, Corps of Engineers, U.S.A.

SCALES OF FEET



Soundings reduced to 0 of L. Providence Gage
 Survey of August 1916 *Q.R.* Chief of Party
 Traced April 1917 by C. J. R.

PLATE N2 2



N A L



MISSISSIPPI RIVER COMMISSION

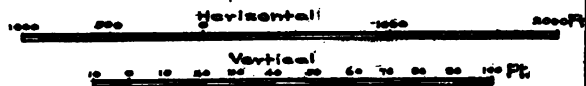
Third District
VICKSBURG REVETMENT

500 M.B.C.

Prepared under the direction of

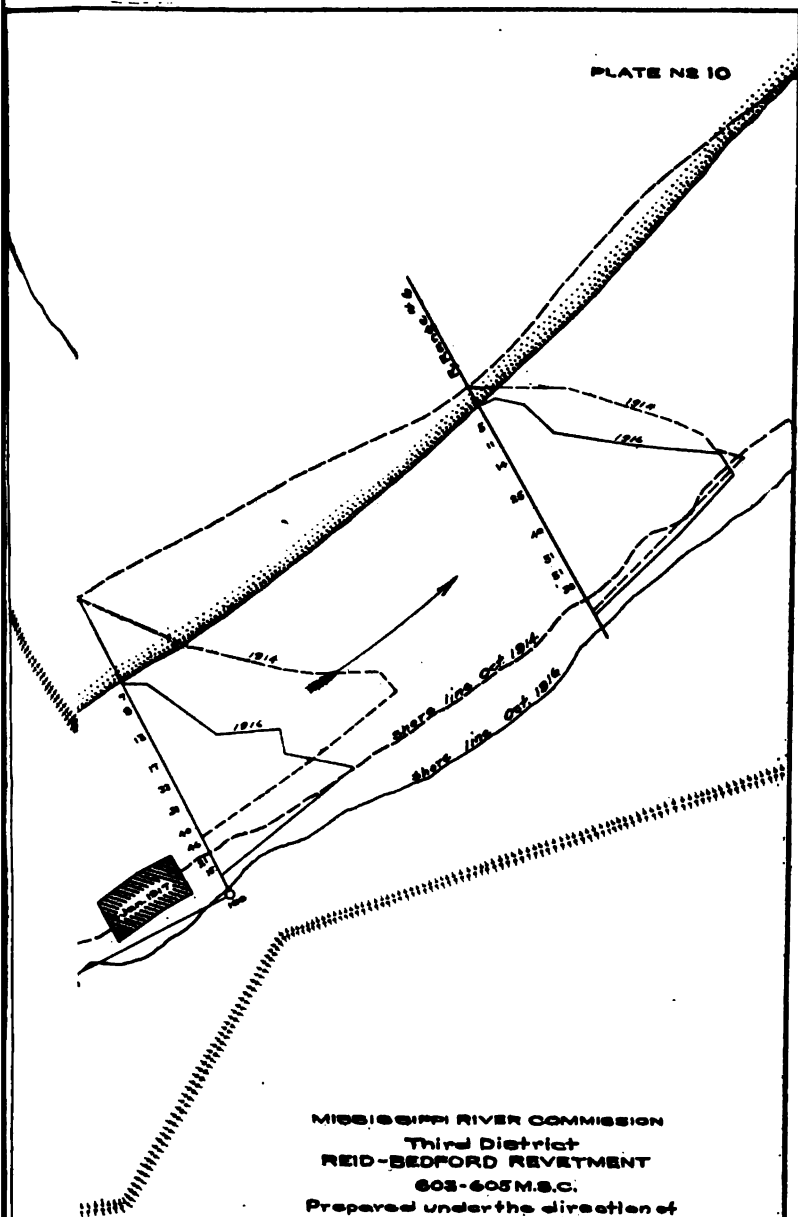
Major J.R. SLATTERY, Corps of Engineers, U.S.A.

SCALES OF FEET



Sounding reduced to 3' of Vicksburg Gage
Survey of Sept 1916 C.J.R. Chief of Party
Traced April 1917 by C.J.R.

PLATE NO 10



MISSISSIPPI RIVER COMMISSION

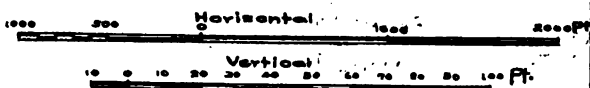
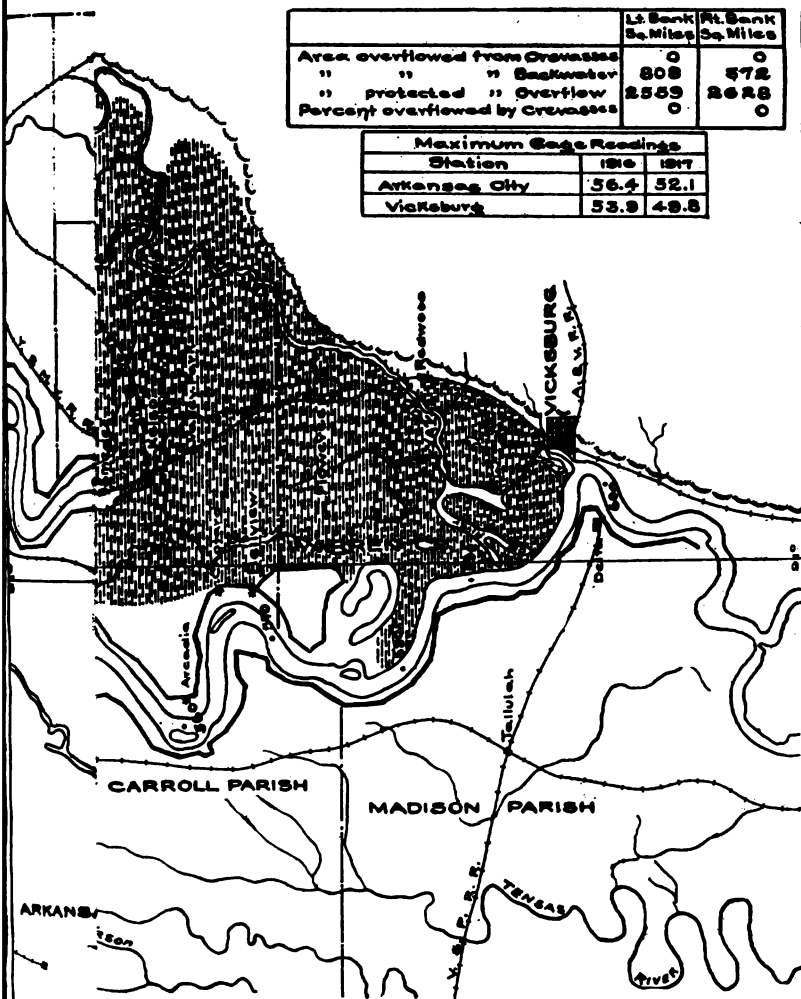
Third District
REID-BEDFORD REVETMENT
603-605 M.S.C.Prepared under the direction of
Major J.R. SLATTERY, Corps of Engineers, U.S.A.
SCALES OF FEET.Soundings reduced to 3 ft. Vicksburg Gage.
Survey of Oct 1916 *C.R.* Chief of Party
Traced April 1917 by G.J.R.

PLATE NO 11

	Lt. Bank Sq. Miles	Rt. Bank Sq. Miles
Area overflowed from Crevasse	0	0
" " " Backwater	808	572
" protected " Overflow	2559	2628
Percent overflowed by Crevasse	0	0

Maximum Gage Readings		
Station	1916	1917
Arkansas City	56.4	52.1
Vicksburg	53.3	49.8



MISSISSIPPI RIVER COMMISSION
Third District
OVERFLOW FROM BACKWATER
HIGH WATER OF 1917

Prepared under the direction of
Major J. R. SLATTERY, Corps of Engineers, U.S.A.

SCALE OF MILES



Compiled from Maps and Records on file in this Office.

Overflow from water flowing around

Atchafalaya Levee.-----

Backwater in Mississippi.-----

Traced May 1917 by e/r.



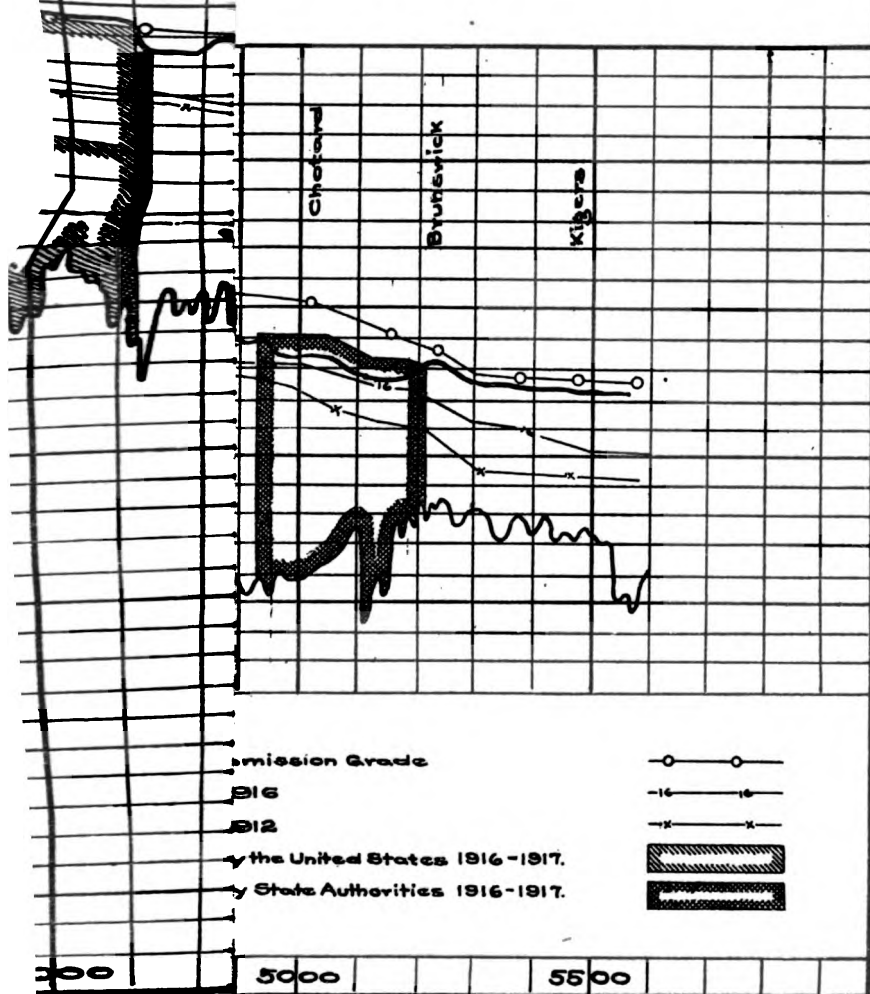
MISSISSIPPI RIVER COMMISSION
Third District
LOWER YAZOO LEVEES

Under the direction of

Major J. R. SLATTERY, Corps of Engineers, U.S. Army,
E. C. Tollinger, Assistant Engineer

Traced April - 1917 by C. J. R.

Palmato



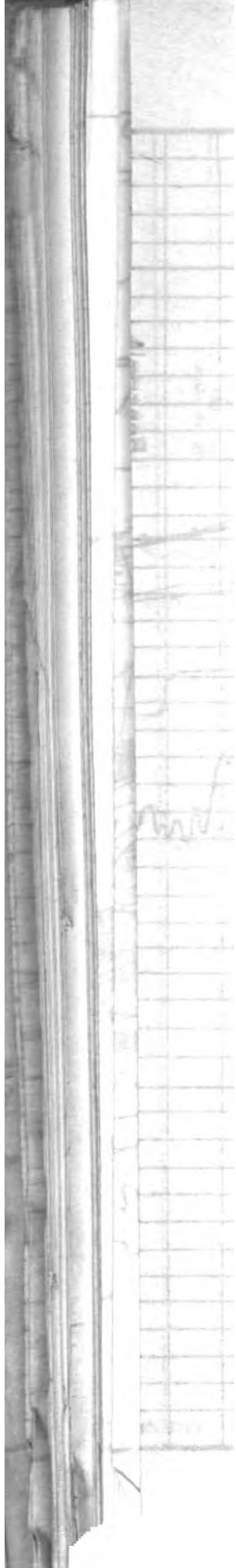
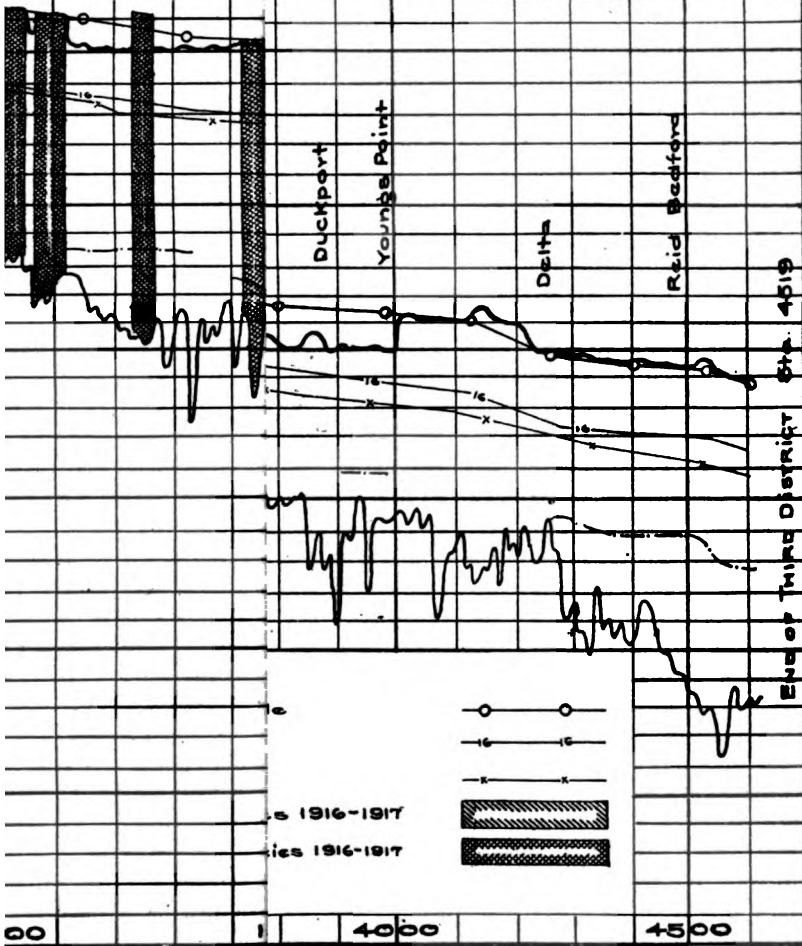


PLATE No 13

Benham

MISSISSIPPI RIVER COMMISSION
Third District
UPPER TENNESAS LEVEES
Improved under the direction of
BATTERY, Corps of Engineers, U.S. Army.
C. Tollinger, Assistant Engineer
Traced April 1917 by C.J.R.



MISSISSIPPI RIVER COMMISSION.

3595

COTTONWOOD, MISS.

Aug. 14, 1916, approved allotment-----	\$240,000.00
Receipts from sales-----	10.00
	<hr/> 240,010.00
June 30, 1917, expended during fiscal year-----	\$214,376.28
Transferred to "Upper Tensas levee district"-----	20,000.00
	<hr/> 234,376.28
July 1, 1917, balance unexpended-----	5,633.72
July 1, 1917, outstanding liabilities-----	2,978.92
	<hr/> 2,654.80
July 1, 1917, balance available-----	

VICKSBURG, MISS.

Aug. 14, 1916, approved allotment-----	100,000.00
Reimbursed by other engineer districts and by United States Weather Bureau-----	562.12
	<hr/> 100,562.12
June 30, 1917, expended during fiscal year-----	70,521.48
	<hr/> 30,040.64
July 1, 1917, balance unexpended-----	
July 1, 1917, outstanding liabilities-----	9,595.60
	<hr/> 20,445.04
July 1, 1917, balance available-----	

REID-BEDFORD BEND, LA.

Aug. 14, 1916, approved allotment-----	100,000.00
June 30, 1917, expended during fiscal year-----	26,479.61
	<hr/> 73,520.39
July 1, 1917, balance unexpended-----	
July 1, 1917, outstanding liabilities-----	\$5,850.31
July 1, 1917, amount covered by uncompleted contracts--	26,000.00
	<hr/> 31,850.31
July 1, 1917, balance available-----	41,670.08

RED FORK, ARK.

Aug. 14, 1916, approved allotment-----	80,000.00
June 30, 1917, expended during fiscal year-----	67,976.93
	<hr/> 12,023.07
July 1, 1917, balance unexpended-----	
July 1, 1917, outstanding liabilities-----	12,023.07
<i>Appropriation for claims for damages by collision, river and harbor works, general defense act Sept. 18, 1916.</i>	
Oct. 19, 1916, allotted for payment of claim of Miller Engineering Co., Little Rock, Ark.-----	\$47.98
June 30, 1917, expended during fiscal year-----	47.98

APPENDIX 4.

IMPROVING MISSISSIPPI RIVER, FOURTH DISTRICT.

This district extends from Warrenton, Miss., 7½ miles below Vicksburg, Miss., to the Head of Passes, about 13 miles from the Gulf of Mexico, a distance of 453 miles by river.

District headquarters, New Orleans, La.

District officer: Maj. W. G. Caples, Corps of Engineers, until November 30, 1916: Maj. Richard C. Moore, Corps of Engineers, until April 29, 1917; Capt.

Beverly C. Dunn, Corps of Engineers, until May 10, 1917; Lieut. Col. George McC. Derby, United States Army, since May 11, 1917.

President of the Mississippi River Commission, Col. C. McD. Townsend, Corps of Engineers.

WORKS.

I. Revetments:

- (a) Hard Times Bend.
- (b) Bondurant Chute.
- (c) Kempe Bend.
- (d) Harbors at Natchez, Miss., and Vidalia, La.
- (e) Junction of the Mississippi, Red, and Atchafalaya Rivers.
- (f) Grand Bay.
- (g) Plaquemine, La.
- (h) Harbor at New Orleans, La.
- (i) General repairs and stone.

II. Levees:

- (a) Lower Tensas levee district.
- (b) Atchafalaya levee district.
- (c) Lafourche levee district.
- (d) Barataria levee district.
- (e) Homochitto levee district.
- (f) Pontchartrain levee district.
- (g) Lake Borgne levee district.

III. Surveys:

IV. Plant:

- (a) Revetment plant.
- (b) Levee plant.

I. REVETMENTS.

(a) *Hard Times Bend.*

Location.—Six hundred and thirty-three miles below Cairo, right bank.

Original condition.—Caving in this bend has been in progress from an early date. The exact date when caving commenced is not known. The caving continued until, in 1910, it threatened the controlling levee line crossing the foot of Lake St. Joseph. The destruction of this line would necessitate the building of a long and expensive loop levee back of the lake and the abandonment of much valuable land.

Previous projects.—None.

Present project.—The present project was adopted by the Mississippi River Commission in 1910, and is to protect, with standard revetment of willow mattresses and upper-bank paving, those caving banks where the levee line in Hard Times Bend is most threatened.

Operations and results prior to the present year.—Under the existing project a total of 7,689 linear feet of bank has been protected with mattresses 300 feet wide, and the upper bank paved with rock. The amounts spent for original work and for maintenance prior to the beginning of the present year were \$242,116.25 and \$9,818.14, respectively, a total of \$251,934.39. The work has been successful in protecting the levee line in its immediate rear. The project is uncompleted.

Operations and results during the present year.—Operations for the year consisted in widening the channel mats placed previous years from 300 to 400 feet between sections 36 and 41, covering a length of 2,580 feet of bank, and requiring 2,400 squares of mattress; placing connecting mats for 200 feet requiring 367 squares, and upper bank pavement for 500 feet requiring 1,008 squares, at upper end of the revetment where scour had developed back of the mats; repairing cave 150 feet long at section 36, requiring 485 squares of mattress and 217 squares of pavement; sinking one connecting piece at lower end of revetment where scour had developed back of the mat, covering 120 feet of bank and requiring 150 squares of mattress; miscellaneous repairs to pavement, 279 squares, and cutting timber 300 feet wide for about 3,000 feet above the revetment to prevent forming obstructions to proposed extension of work upstream.

The mats used were of the framed type and were constructed 20 miles above at Lake Palmyra and towed to Hard Times.

The upper bank was paved with concrete 4 inches thick and rock 10 inches thick. At the ends where scour might undermine the concrete it was reinforced with wire mesh. There were used 325 squares of concrete with wire reinforcement, 670 without, and 509 squares of rock pavement.

Work was commenced November 9, 1916, when a force was sent to Lake Palmyra to build mats, and completed January 19, 1917, when the cutting of the timber above the revetment was finished.

The work was done by hired labor, with Government plant, at a total field cost of \$34,027.22, of which \$12,755.20 was for new work and \$21,272.02 for maintenance.

The cost of the work done, as given above, includes \$568.99 for cutting timber above the present revetment, and should be charged to future work in this bend. The detailed costs are shown in the following tables:

HARD TIMES BEND (633 R.), FOURTH DISTRICT.

Mattresses, total area 3,402 squares (channel mats, 84.8 per cent; connecting mats, 15.2 per cent).

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$165.15		\$0.049
Lumber.....	165,991	2,375.33	48.792	.698
Wire, No. 12..... pounds..	1,821	30.51	.358	.009
Nails, wire..... do.....	19,112	563.84	5.636	.166
Tree nails..... number..	31,284	74.79	9.196	.022
Brush and poles..... cords..	3,545	2,928.72	1.042	.081
Miscellaneous expenses.....		278.25		.192
Subsistence.....		653.80		.251
Steamboat expenses.....		852.60		.513
Labor.....		1,745.22		.066
Supervision.....		327.00		
Total field cost.....		9,995.21		

BALLASTING AND SINKING.

Mobilization and demobilization.....		\$321.53		\$0.095
4-in strand..... pounds..	350	15.00	0.103	.004
Lumber.....	10,405	149.83	3.058	.044
Wire, No. 12..... pounds..	1,800	67.50	.529	.019
Nails, wire..... do.....	1,100	33.00	.323	.009
Same..... tons..	3,066	6,898.50	.901	2.078
Miscellaneous expenses.....		340.20		.100
Subsistence.....		844.40		.249
Steamboat expenses.....		777.08		.228
Labor.....		1,810.66		.532
Supervision.....		226.15		.067
Total field cost.....		11,483.85		

Grading (1,865 linear feet or 2,040 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$96.63		\$0.047
Coal..... tons..	61.20	293.76	0.030	.144
Oil.....		10.87		.005
Miscellaneous expenses.....		624.00		.306
Subsistence.....		527.52		.259
Steamboat expenses.....		114.96		.057
Labor.....		1,480.00		.725
Supervision.....		110.52		.055
Total field cost.....		3,258.26		

3598 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Paving, rock and concrete (720 linear feet or 1,504 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$446.19		\$0.297
Stone..... tons	712	1,602.00	1.399	3.147
Cement..... sacks	6,616	2,679.48	6.649	2.683
Sand and gravel..... cubic yards	1,129	350.22	1.135	.352
Coal..... tons	17.45	89.32	.018	.090
Oil.....		5.95		.006
Miscellaneous expenses.....		795.97		.363
Subsistence.....		897.80		.597
Steamboat expenses.....		464.46		.309
Labor.....		1,967.70		1.308
Supervision.....		318.98		.211
Total field cost.....		9,616.07		

Summary of costs (3,050 linear feet revetted).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square. ¹	Total.		
Total field cost.....	\$6.313	\$21,479.15	\$8.560	\$12,874.33	\$34,353.48	\$11.26
Office expenses.....	.436	1,483.56	.591	889.55	2,373.11	.78
Surveys.....	.099	337.72	.134	202.49	540.21	.17
Care of plant.....	.198	673.94	.259	389.06	1,063.00	.35
Repair of plant.....	1.456	4,953.52	.852	1,282.32	6,235.84	2.04
Depreciation of plant.....	.361	1,228.61	.489	736.67	1,965.29	.64
Total.....	8.863	30,156.50	10.885	16,374.42	46,530.92	15.24

¹ Cost per square completed upper bank work.

The field work was in charge of Asst. Engineer E. B. Geddes, assisted by Junior Engineer Geo. C. Schoenberger and Supt. J. R. Allen.

Condition at end of present year.—A total of 7,689 linear feet of standard bank revetment of willow mattresses and stone has been placed on the bank in front of a portion of the threatened levee, but a further extension of 3,000 linear feet is necessary to fully accomplish the results for which the work was designed. So far as is known, the work in place is in good condition. The annual survey developed the fact that scour is taking place outside of the present mats.

Total expenditures on existing project were \$250,227.43 for new work, and \$31,187.06 for maintenance, making a total of \$281,414.49. The project has not yet been completed.

Local cooperation.—None.

Proposed operations.—Three-tenths, approximately, of the project remains uncompleted and consists of revetting unprotected bank. It is proposed to maintain the existing revetment and to extend it upstream as far as funds will permit, estimated at about 3,000 feet.

Effect of improvement.—The effect of the improvement has been to correct, permanently locate, and deepen the channel, to protect the banks of the river and to preserve the controlling levee line.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1917, exclusive of receipts from sales, etc., formerly included:

New work.....	\$263,506.83
Maintenance.....	41,770.65
Total expended.....	305,277.48
Total appropriations to June 30, 1917.....	381,000.00

Fiscal year ending June 30.	1913	1914	1915	1916	1917
Expended for new work.....	.....	\$140,000.13	\$9,991.59	\$90,012.77	\$21,390.58
Expended for maintenance.....	\$149.83	.....	507.76	6,903.10	31,952.51
Total expended.....	149.83	140,000.13	10,199.35	96,915.87	53,343.09
Appropriated or allotted.....	140,000.00	10,000.00	126,000.00	100,000.00	.....

July 1, 1916, balance unexpended..... \$29,065.61
Amount allotted from river and harbor act approved July 27, 1916.. 100,000.00

129,065.61

June 30, 1917, amount expended during fiscal year, exclusive of receipts from sales:

For new work..... \$21,390.58

For maintenance..... 31,952.51

53,343.09

July 1, 1917, balance unexpended..... 75,722.52

July 1, 1917, outstanding liabilities..... 4,992.72

July 1, 1917, amount covered by uncompleted contracts... 39,890.03

44,882.75

July 1, 1917, balance available..... 30,839.77

Balance available for fiscal year ending June 30, 1918..... 30,839.77

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
June 25, 1910 (river and harbor).....	July 6, 1910	\$5,000.00
Mr. 4, 1913 (river and harbor).....	Apr. 30, 1913	140,000.00
Oct. 2, 1914 (river and harbor).....	Oct. 20, 1914	10,000.00
Mr. 4, 1915 (river and harbor).....	Apr. 26, 1915	126,000.00
July 27, 1916 (river and harbor).....	Aug. 14, 1916	100,000.00
Total.....		381,000.00

*Original allotment, \$168,000; \$42,000 transferred to harbors at Natchez and Vidalia, Miss and La.

Contracts in force.—None.

(b) Bondurant Chute.

Location.—Six hundred and forty-three miles below Cairo, right bank.

Original condition.—Caving in this bend commenced in 1890 and continued until 1899, when it threatened the last practicable line of levee between the river and Lake Bruen. The abandonment of the existing levee would have necessitated the construction of a long line of new levee behind Lake Bruen and the exposure to overflow of a large area of cultivated land.

Previous projects.—None.

Present project.—The present project was adopted by the Mississippi River Commission in 1899 and provided for revetting the caving bank with board mattresses 100 feet wide, grading the upper bank, and paving it with concrete-in-situ. The project was modified in 1900 to provide for the use of standard mattresses of willow brush. A further modification in 1903 provided for the use of rock for upper-bank paving.

Operations and results prior to present year.—Under the project and modifications work was commenced in 1899 and a total of 4,150 linear feet of bank were protected with mattresses from 100 to 200 feet wide and the upper bank was paved. The original board mattresses were reinforced with mattresses of willow brush and most of the concrete-in-situ upper-bank paving was replaced with rock. The work has been successful in maintaining the levee line in front of Lake Bruen. The amount spent for original work was \$62,432.82 and for maintenance was \$16,047.18, a total of \$78,500.

Operations and results during the present year.—Operations during the year consisted in repairing cave between sections 6 and 9, and storing rock on the bank for future use. The bank in the cave was matted 150 feet wide for 740 linear feet, requiring 1,170 squares, and the upper bank was graded and paved with rock for 820 feet, requiring 225 squares of pavement. In addition to 886 tons already on hand, there were unloaded on the bank in the chute 1,444 tons of rock to be used next season for extending the work downstream.

The channel mats, amounting to 1,050 squares, were constructed at Lake Palmyra and towed into the chute when the river had reached a suitable stage to permit boats to operate in the channel of the chute.

The connecting mats, amounting to 120 squares, were constructed in the chute from willows on Bondurant Island.

Work was commenced January 4, 1917, and completed February 18, 1917.

The work was done by hired labor with Government plant, at a total field cost of \$13,001.63 for maintenance.

The detailed costs are shown in the following tables:

BONDURANT CHUTE (643 R.), FOURTH DISTRICT.

Mattresses, total area 1,170 squares (channel mats, 89.7 per cent; connecting mats, 10.3 per cent).

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$48.35		\$0.041
Lumber.....foot	72,136	1,041.97	61.655	.890
Wire, No. 12.....pounds	515	14.12	5.440	.012
Nails, wire.....	6,414	193.72	5.481	.106
Treenails.....No.	9,092	23.25	8.283	.020
Brush and poles.....cord	1,219	807.23	1.042	.670
Subsistence.....		142.53		.122
Steamboat expenses.....		843.54		.720
Labor.....		1,022.85		.874
Supervision.....		150.73		.129
Total field cost.....		4,287.50		

BALLASTING AND SINKING.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$150.40		\$0.121
1-inch strand.....pounds	280	12.00	30.239	.014
Lumber.....foot	800	7.80	.427	.004
Wire, No. 12.....pounds	500	20.00	.427	.01
Nails, wire.....	672	20.46	.574	.01
Stone.....tons	898	2,215.70	.767	1.86
Miscellaneous expenses.....		32.17		.02
Subsistence.....		330.71		.25
Steamboat expenses.....		845.84		.72
Labor.....		724.08		.61
Supervision.....		240.47		.20
Total field cost.....		4,598.98		

Grading (820 linear feet, or 250 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Station and demobilization		\$59.00		\$0.235
.....		158.70		.635
.....		30.20		.121
.....		512.16		2.049
.....		95.00		.380
Total field cost		855.06		

Paving, rock and concrete (820 linear feet, or 225 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Station and demobilization		\$100.00		\$0.444
..... tons	945	2,138.80	3.755	9.806
.....		30.95		.138
.....		186.12		.827
.....		339.76		1.510
.....		403.80		1.795
.....		60.47		.269
Total field cost		3,260.00		

Summary of costs (820 linear feet revetted).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square. ¹	Total.		
Field cost	\$7.505	\$8,880.57	\$17.909	\$4,115.06	\$13,001.63	\$15.855
.....	.351	445.33	.961	216.15	664.88	.81
.....	.132	154.58	.317	71.42	226.00	.27
.....	.872	1,019.73	2.094	471.11	1,490.84	1.82
.....	.446	522.09	1.075	241.91	764.00	.93
Total	9.426	11,028.30	22.356	5,115.65	16,147.35	19.68

¹ Cost per square completed upper bank work.

Condition at end of present year.—A total of 4,150 linear feet of bank protection has been placed, covering that portion of the bank where the levee was damaged. Changes in the channel at the head of the chute has caused the bank to rise along the upper revetment, but has increased the strain against the lower part and caused active caving below the revetment. Total expenditures for the existing project were \$62,452.82 for new work, and \$27,978.12 for maintenance, making a total of \$90,430.94. The project appears to be completed, but further extension downstream will probably be necessary.

Local cooperation.—None.

Proposed operations.—Maintenance of the existing revetment

Effect of improvement.—The effect of the improvement has been to correct, permanently locate, and deepen the channel, to protect the banks of the river and preserve the controlling levee line.

3602 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1917, exclusive of receipts from sales, etc., formerly included:

New work.....	\$62,452.
Maintenance.....	27,907.
Total expended.....	90,359.

Total appropriations to June 30, 1917..... 113,500.

Fiscal year ending June 30.	1913	1914	1915	1916	1917
Expended for new work.....		\$7,691.82	\$957.45		
Expended for maintenance.....		992.39	440.02	\$1,210.71	\$11,839.
Total expended.....		8,684.21	1,397.47	1,210.71	11,839.
Appropriated or allotted.....	\$10,500.00			35,000.00	

Amount allotted from river and harbor act approved July 27, 1916... \$35,000.
 June 30, 1917, amount expended during fiscal year, exclusive of receipts from sales, for maintenance..... 11,839.

July 1, 1917, balance unexpended..... 28,140.
 July 1, 1917, outstanding liabilities..... 3,650.

July 1, 1917, balance available for fiscal year ending June 30, 1918... 19,489.

Abstract of appropriations.

Act of Congress.	Allotted.	Amount
Mar. 3, 1899 (sundry civil).....	July 5, 1899	\$10.
Do.....	Mar. 26, 1900	16.
June 13, 1902 (river and harbor).....	July 12, 1902	16.
Mar. 3, 1903 (sundry civil).....	July 21, 1903	5.
Apr. 28, 1904 (sundry civil).....	Apr. 1, 1904	3.
Mar. 3, 1905 (sundry civil).....	Apr. 26, 1905	3.
June 30, 1906 (sundry civil).....	June 28, 1906	15.
Do.....	Sept. 10, 1906	15.
Mar. 2, 1907 (river and harbor).....	Mar. 27, 1907	10.
May 27, 1908 (sundry civil).....	May 4, 1908	10.
Mar. 4, 1909 (sundry civil).....	Apr. 28, 1909	3.
Mar. 4, 1913 (river and harbor).....	(1)	10.
July 27, 1916 (river and harbor).....	Aug. 14, 1916	3.
Total.....		113.

¹ By transfer.

Contracts in force.—None.

(c) Kempe Bend.

Location.—Six hundred and fifty-eight miles below Cairo, right bank.

Original condition.—Caving in this bend commenced about 1865 and continued with unusual rapidity, destroying one levee after another until 1899, when had nearly reached a final line of levee, the destruction of which would have necessitated a new levee of extremely difficult and costly construction. Construction of a new line would have required a long period of time, and a break in the front line in the meantime would have been disastrous to a large section of country.

Previous projects.—None.

Present project.—The present project was adopted by the Mississippi River Commission in 1899, and provided for revetting the caving bend with standing revetment of willow mattresses and upper-bank paving of rock.

Operations and results prior to the present year.—The work was commenced in 1899, and a total of 28,616 linear feet of bank was protected with mattresses.

300 feet wide, and the upper bank was paved with rock. Numerous failures of the revetment occurred, permitting the upper bank to recede in places, but not seriously jeopardizing the levee line which it was designed to protect. All breaks in the revetment were repaired. The effect of the work was to preserve the levee line. The amount spent for original work was \$1,104,977.70 and for maintenance was \$250,578.75, a total of \$1,355,556.45.

Operations and results during the present year.—Operations during the year in Kempe Bend were confined to making needed repairs to existing work as follows: The cave between sections 27 and 33 was matted 300 feet wide for 1386 linear feet, requiring 5,218 squares, leaving a gap of 300 feet unprotected where on account of the high stage of the river and swift current it was impracticable to sink mats.

The upper bank along this stretch was graded for 2,080 linear feet and paved with rock and concrete to about a 30-foot stage for 1,100 feet, requiring 640 squares of rock and 467 squares of concrete pavement. The cave at section 41 was matted with mats 200 feet wide for 450 feet, requiring 788 squares. The timber along the caves lower down in the bend was felled 200 feet wide for a length of 2,500 linear feet.

The mats for this work were constructed at Lake Palmyra and towed to Kempe Bend, a distance of about 55 miles.

Work was commenced November 24, 1916, and continued when river conditions permitted until February 25, 1917, when all work was suspended on account of high water.

The work was done by hired labor with Government plant, at a total field cost of \$48,158.94 for maintenance.

The above cost includes \$486.77 expended in cutting timber where future work is contemplated.

The detailed costs of the revetment are shown in the following tables:

KEMPE BEND (658 R.), FOURTH DISTRICT.

Mattresses, total area 6,006 squares (channel mats, 100 per cent).

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Station and demobilization.....		\$197.40		\$0.033
Mat.....	295,594	4,257.51	49.216	.709
No. 12..... pounds	2,322	63.73	.387	.011
Wire.....	34,141	1,032.37	5.684	.172
Manila..... number	55,134	131.83	9.179	.022
And poles..... cords	6,252	5,276.13	1.041	.878
Manila..... pounds		292.86		.049
Incidental expenses.....		138.68		.023
Boat expenses.....		1,633.83		.272
Motor expenses.....		1,732.70		.288
Supervision.....		2,530.87		.422
		718.60		.119
Total field cost.....		18,006.51		

BALLASTING AND SINKING.

Station and demobilization.....		\$573.53		\$0.095
Strand..... pounds	700	30.00	0.116	.005
No. 12..... pounds	10,000	144.00	1.664	.024
Wire..... pounds	2,500	100.00	.416	.017
Manila..... tons	4,000	120.00	.666	.019
And poles..... pounds	4,096	11,035.60	.782	1.837
Manila.....		439.29		.075
Incidental expenses.....		145.20		.024
Boat expenses.....		780.00		.129
Motor expenses.....		855.70		.142
Supervision.....		2,384.92		.398
		621.34		.103
Total field cost.....		17,220.58		

8604 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Grading (2,080 linear feet or 2,088 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilisation and demobilisation.....		\$64.40		\$0.031
Rope, manila..... pounds.....		232.86		.141
Coal..... tons.....	125	675.00	0.069	.338
Oil.....		37.94		.018
Miscellaneous expenses.....		46.20		.023
Subsistence.....		812.07		.399
Steamboat expenses.....		90.00		.043
Labor.....		2,064.89		1.001
Supervision.....		308.60		.148
Total field cost.....		4,413.56		

Paving, rock and concrete (1,100 linear feet or 1,107 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilisation and demobilisation.....		\$284.44		\$0.266
Stone..... tons.....	1,680	3,890.50	2.547	5.985
Rope, manila..... pounds.....		292.86		.264
Cement..... sacks.....	3,368	1,364.04	7.212	2.921
Sand and gravel..... cubic yards.....	575	178.37	1.231	.282
Coal..... tons.....	5.82	29.80	.013	.064
Oil.....		2.00		.004
Miscellaneous expenses.....		26.99		.024
Subsistence.....		841.59		.809
Steamboat expenses.....		435.12		.392
Labor.....		1,044.08		.943
Supervision.....		192.78		.174
Total field cost.....		8,022.52		

Summary of costs (2,436 linear feet revetted).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square. ¹	Total.		
Total field cost.....	\$5.867	\$35,236.09	\$9.365	\$12,436.06	\$47,672.17	\$19.57
Office expenses.....	.306	1,847.00	.589	651.87	2,642.02	1.06
Surveys.....	.122	730.70	.233	257.88	968.58	.41
Care of plant.....	.136	819.67	.322	356.33	1,176.00	.48
Repair of plant.....	.720	4,326.41	.169	1,866.43	6,192.84	2.54
Depreciation of plant.....	.345	2,070.70	.660	730.83	2,801.53	1.15
Total.....	7.498	45,030.57	11.338	16,299.42	61,473.14	25.23

¹ Cost per square completed upper bank work.

Condition at end of present year.—A total of 28,616 linear feet of bank has been protected with a standard revetment of willow mattresses and stone, and the controlling levee line has been preserved. In past years numerous failures of the revetment have occurred and have been repaired. A recent failure of a length of about 2,500 feet has not so far been repaired because of extreme high water. None of the failures have seriously jeopardized the levee line. The project is considered completed, but annual maintenance will be required.

Total expenditures on existing project were \$1,104,977.70 for new work and \$298,472.93 for maintenance, making a total of \$1,403,450.63. The project has been completed, but annual maintenance will be necessary.

Local cooperation.—None.

Proposed operations.—Maintenance of existing revetment.

Effect of improvement.—The effect of the improvement has been to correct, permanently locate and deepen the channel, to protect the banks of the river, and to preserve the controlling levee line.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1917, exclusive of receipts from sales, etc., formerly included:

New work.....	\$1, 104, 977. 70
Maintenance.....	305, 181. 15
Total expended.....	1, 410, 158. 85
Total appropriations to June 30, 1917.....	1, 440, 000. 00

Fiscal year ending June 30.	1913	1914	1915	1916	1917
Expended for new work.....	\$113, 114. 68				
Expended for maintenance.....	11, 371. 34	\$24, 782. 12	\$52, 142. 03	\$9, 009. 65	54, 602. 40
Total expended.....	124, 486. 02	24, 782. 12	52, 142. 03	9, 009. 65	54, 602. 40
Appropriated or allotted.....	19, 000. 00	60, 000. 00	20, 000. 00	65, 000. 00	

July 1, 1916, balance unexpended.....	\$19, 443. 55
Amount allotted from river and harbor act approved July 27, 1916.....	65, 000. 00

84, 443. 55

June 30, 1917, amount expended during fiscal year, exclusive of receipts from sales, for maintenance.....	54, 602. 40
---	-------------

July 1, 1917, balance unexpended.....	29, 841. 15
July 1, 1917, outstanding liabilities.....	\$3, 677. 97
July 1, 1917, amount covered by uncompleted contracts.....	1, 601. 42
	5, 279. 39

July 1, 1917, balance available for fiscal year ending June 30, 1918.....	24, 561. 76
---	-------------

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
Mar. 3, 1899 (sundry civil).....	Mar. 13, 1900	\$180, 000. 00
June 6, 1900 (sundry civil).....	July 14, 1900	150, 000. 00
June 13, 1902 (river and harbor).....	July 12, 1902	60, 000. 00
Mar. 3, 1903 (sundry civil).....	July 21, 1903	64, 000. 0 0
Do.....	(¹)	30, 000. 0 0
Apr. 28, 1904 (sundry civil).....	Apr. 1, 1904	80, 000. 0 0
Mar. 3, 1905 (river and harbor).....	Apr. 26, 1905	90, 000. 0 0
June 30, 1906 (sundry civil).....	June 28, 1906	50, 000. 0 0
Mar. 2, 1907 (river and harbor).....	Mar. 27, 1907	12, 000. 0 0
May 27, 1908 (sundry civil).....	(¹)	25, 000. 0 0
Mar. 4, 1909 (sundry civil).....	Apr. 28, 1909	65, 000. 0 0
June 25, 1910 (sundry civil).....	Apr. 30, 1910	90, 000. 0 0
Do.....	(¹)	10, 000. 0 0
Feb. 27, 1911 (river and harbor).....	May 3, 1911	275, 000. 0 0
Do.....	(¹)	5, 000. 0 0
July 25, 1912 (river and harbor).....	Aug. 3, 1912	90, 000. 0 0
Mar. 4, 1913 (river and harbor).....	Apr. 30, 1913	19, 000. 0 0
Oct. 2, 1914 (river and harbor).....	Oct. 15, 1914	60, 000. 0 0
Mar. 4, 1915 (river and harbor).....	Apr. 18, 1915	* 20, 000. 0 0
July 27, 1916 (river and harbor).....	Aug. 14, 1916	65, 000. 0 0
Total.....		1, 440, 000. 00

¹ By transfer.

* Original allotment, \$50,000; \$30,000 transferred to harbors at Natchez and Vidalia, Miss. and La.

Contracts in force.—None.

(d) Harbors at Natchez, Miss., and Vidalia, La.

Location.—From 687 to 700 miles below Cairo, left and right banks.

Original condition.—Caving of the river banks in Giles and Marengo Bends and in front of the city of Natchez, was in existence as far back as any authentic record exists. In Giles Bend the caving had progressed to such extent that a cut-off was threatened through the neck of land between Giles and Cowpen Bends, which cut-off would have destroyed the harbors of Natchez and Vidalia, as well as causing a serious disturbance of the general run of the river for many miles above and below. In Marengo Bend the caving had destroyed the last practicable line of levee between Lake Concordia and the river and caused the construction of a new line behind the lake in 1897. Many thousand acres of valuable farming lands had been destroyed. Caving continued and in 1912 threatened the destruction of the new line behind the lake, as well as an important railroad line. In front of the city of Natchez continued caving had destroyed nearly all of the historic "Natchez under-the-Hill," and was threatening the site of the waterworks supply the city of Natchez.

Previous projects.—The work originated in a joint congressional resolution passed June 28, 1879. The project provided for protecting the caving in Giles and Marengo Bends with brush and stone. Work was carried on under this project during 1881 and 1882. Amount expended, \$82,470.91. No trace of this work remains.

Present project.—Under act of August 2, 1882, the work was placed in the direction of the Mississippi River Commission, but remained dormant except for frequent surveys and examinations, until 1892. On November 1, 1892, the commission adopted a project calling for the construction of a levee along the axis of Cowpen Neck to prevent the flow of water during high stage of the river across the neck and consequent danger of a cut-off. On March 1, 1897, a project was adopted for the protection of the bank in Giles Bend by means of submerged sloping spur dikes placed at intervals of about 450 feet. In 1899 the project was modified to provide for continuous revetment of standard type, with mattresses 300 feet wide, together with upper-bank protection, the latter to be placed only after the action of the river had graded the upper bank to a sufficiently flat slope. This restriction, so far as it related to work subsequent to 1899, was removed in June, 1900. In 1907 the project was modified to include the revetment of the Natchez front with standard revetment, and in 1912 to include the revetment of Marengo Bend.

Operations and results prior to the present year.—In Giles Bend the levee was completed in 1895 and was raised and enlarged in 1898. The levee had a length of 19,500 feet. Work on the revetment was begun in 1897 and continued from year to year until in 1911 it had a total length of 23,454 feet. Since 1911 about 3,989 feet of the revetment has been destroyed by caving together with about the same length of levee. The effective length of revetment was reduced to 19,464 feet, and of the levee to 15,511 feet. The effect of the work had been to prevent the threatened cut-off between Giles and Cowpen Bends. Amounts spent for original work and for maintenance were \$1,296,587.54 and \$324,897.82, respectively, a total of \$1,621,485.36.

In Marengo Bend a total of 12,844 linear feet of standard revetment was placed. The effect of the work was to preserve the controlling levee. Amounts spent for original work and for maintenance were \$381,857 and \$21,316, respectively, a total of \$403,173.86.

On the Natchez front the bank was revetted with standard revetment 3,546 linear feet in two detached pieces; upper, 2,136 feet long, and the lower, 1,400 feet long, separated by an unprotected gap of about 1,600 feet. The effect of the work was to prevent further recession of the bank where protected and to preserve the site of the waterworks. Amounts spent for original work and for maintenance were \$120,730.26 and \$5,064.58, respectively, a total of \$125,794.84.

The total amounts spent on harbors of Natchez and Vidalia for original work and for maintenance were \$1,799,174.80 and \$351,282.26, respectively, a total of \$2,150,457.06.

Operations and results during the present year.—The harbors of Natchez and Vidalia include improvement works in Giles Bend, Marengo Bend, and along the Natchez front.

Giles Bend.—Operations for the year consisted in extending the revetment at the lower end; widening the mats between sections 48 and 50, and making

extensive repairs to the lower part of the revetment where caving had occurred, and completing the extension and repairs on Cowpen Point Levee, as follows: The cave between sections 82 and 86 was matted for 1,445 linear feet, requiring 4,796 squares; cave at section 37 matted for 640 linear feet, requiring 1,900 squares; one sinking placed on salient at section 36, requiring 406 squares; two connecting mats placed between sections 48 and 49 covering 800 linear feet of bank, and requiring 365 squares; repairs were made at lower end of revetment and extension covering 300 linear feet, requiring 1,027 squares; widening mats at lower end for 300 linear feet, requiring 450 squares. The upper bank was graded for 8,955 linear feet on the above and paved with concrete and rock for a length of 4,020 linear feet, requiring 3,217 squares of concrete and 248 squares of rock pavement. Of the concrete pavement 537 squares were reinforced with wire mesh.

Work on lot 8 Cowpen Point Levee was completed, and wave wash restored along 6,350 linear feet and the levee resodded; a spur to divert the current from the slope of the levee was constructed 100 feet long containing 1,500 cubic yards of earth, and paved with rock; one piece of mattress constructed and sunk in hole scoured at end of levee, and concrete pavement destroyed, replaced with 444 squares of rock pavement.

During the high water in April some work was found necessary to protect the slope on lot 3 from the current and wave wash, and some additional paving had to be done on the spur.

Work in this bend was commenced on August 15, 1916, and continued with several interruptions until February 5, 1917.

The mats used in Giles were constructed at Kempe Island, about 20 miles above the work.

The work was done by hired labor with Government plant, at a total field cost of \$113,170.37 for maintenance.

The cost as given above includes \$19,571.62 for construction and \$12,151.16 for maintenance at Cowpen Point Levee.

The detailed costs of the revetment are shown in the following tables:

GILES BEND (687 L.), FOURTH DISTRICT.

Mattresses, total area 9,043 squares (channel mats, 95.9 per cent; connecting mats, 4.1 per cent).

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$296.10		\$0.082
Lumber..... b. m.	446,646	5,851.03	49,391	.647
Wire, No. 12..... pounds..	3,422	70.60	5,386	.008
Nails, wire.....	50,954	920.67	5,334	.102
Trunnels..... number	33,040	298.49	9,182	.033
Brush and poles..... cords..	9,422	11,029.72	1,042	1.219
Miscellaneous expenses.....		516.12		.067
Subsistence.....		1,788.84		.197
Steamboat expenses.....		1,976.72		.219
Labor.....		4,677.52		.518
Supervision.....		979.53		.108
Total field cost.....		28,405.35		

BALLASTING AND SINKING.

Mobilization and demobilization.....		\$560.25		\$0.061
High strand..... pounds..	1,440	60.00	0.159	.007
Lumber..... b. m.	23,140	333.22	2,568	.087
Wire, No. 12..... pounds..	3,500	131.25	.387	.014
Nails, wire.....	3,200	96.00	.354	.011
Stone..... tons..	6,793	14,417.30	.751	1.894
Miscellaneous expenses.....		480.21		.058
Subsistence.....		1,985.70		.222
Steamboat expenses.....		2,487.84		.275
Labor.....		3,403.53		.377
Supervision.....		837.14		.092
Total field cost.....		24,802.44		

Grading (3,955 linear feet or 5,219 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$247.37		\$0.047
Coal..... tons.....	809.90	1,292.16	0.061	.248
Oil.....		91.97		.018
Miscellaneous expenses.....		152.00		.029
Subsistence.....		1,841.96		.353
Steamboat expenses.....		874.36		.072
Labor.....		3,587.67		.687
Supervision.....		596.15		.114
Total field cost.....		8,183.64		

Paving, rock and concrete (4,020 linear feet or 3,460 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$339.70		\$0.098
Stone..... tons.....	382	634.13	1.489	2.609
Cement..... sacks.....	22,596	9,151.38	7.024	2.845
Sand and gravel..... cubic yards.....	4,282	1,331.38	1.334	.414
Coal..... tons.....	55.10	282.11	.017	.067
Oil.....		19.00		.006
Miscellaneous expenses.....		1,032.65		.264
Subsistence.....		1,783.76		.555
Steamboat expenses.....		1,329.40		.384
Labor.....		4,265.32		1.232
Supervision.....		671.33		.195
Total field cost.....		20,740.16		

Summary of costs (4,020 linear feet revetted).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square. ¹	Total.		
Total field cost.....	\$5.884	\$53,207.79	\$8.360	\$28,923.80	\$82,131.59	\$20.43
Office expenses.....	.313	2,823.94	.424	1,467.28	4,366.22	1.09
Surveys.....	.056	507.99	.084	291.52	799.51	.20
Care of plant.....	.162	1,462.41	.227	783.84	2,246.25	.56
Repairs of plant.....	.872	7,888.71	1.223	4,229.13	12,117.84	3.01
Depreciation of plant.....	.342	3,093.49	.490	1,666.80	4,760.29	1.19
Total.....	7.629	68,989.33	10.807	37,391.37	106,450.70	26.48

¹ Cost per square complete upper bank work.

Marengo Bend.—Operations during the year were confined to making repairs to existing work, as follows:

One connecting mat placed at upper end of revetment where scour had occurred back of the channel mats, containing 150 squares, and the upper bank graded and paved with concrete for 310 linear feet, requiring 860 squares; cave between sections 3 and 4 matted for 425 linear feet, requiring 1,537 squares, and the upper bank paved with rock and concrete for 510 linear feet, requiring 360 squares; connecting mats placed at sections 8 and 12, requiring 150 squares; cave at sections 17 and 19 matted for 817 linear feet, requiring 1,913 squares, and the upper bank graded and paved for 1,050 linear feet, requiring 813 squares; cave between sections 20 and 21 matted for 655 linear

feet, requiring 2,481 squares, and upper bank graded and paved for 880 linear feet, requiring 673 squares; cave at section 22 matted for 175 linear feet, requiring 548 squares, and the upper bank graded and paved for 290 linear feet, requiring 208 squares.

Of the 2,900 squares of pavement placed 871 squares were rock and 2,038 squares concrete. Of the concrete pavement 993 squares were reinforced with wire mesh.

The mats used on this work were constructed on Big Black Island principally, about 70 miles above Giles Bend.

Work was commenced October 3, 1916, and completed March 8, 1917.

The work was done by hired labor with Government plant at a total field cost of \$62,722.16 for maintenance.

The detailed costs are shown in the following tables:

MARENGO BEND (692 R.), FOURTH DISTRICT.

Mattresses, total area 6.779 squares (channel mats, 95.6 per cent; connecting mats, 4.4 per cent).

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$230.30		\$0.084
Lumber.....	349,623	4,825.73	51.575	.712
Wire, No. 12..... pounds..	2,650	51.20	.391	.008
Nails, wire..... do.	38,623	917.31	5.697	.135
Trenails..... do.	62,941	160.61	9.285	.022
Brush and poles..... cords..	7,142	6,937.47	1.054	1.024
Miscellaneous expenses.....		51.07		.008
Subsistence.....		1,544.48		.228
Steamboat expenses.....		1,320.58		.174
Labor.....		4,011.48		.591
Supervision.....		429.97		.063
Total field cost.....		20,470.20		

BALLASTING AND SINKING.

Mobilization and demobilization.....		\$467.45		\$0.069
1-inch strand..... pounds..	720	30.00	0.106	.004
Lumber.....	13,360	181.38	1.973	.027
Wire, No. 12..... pounds..	2,800	166.00	.413	.015
Nails, wire..... do.	3,200	96.00	.472	.014
Stones..... tons..	5,434	13,561.20	.802	2.001
Miscellaneous expenses.....		118.80		.017
Subsistence.....		1,078.40		.169
Steamboat expenses.....		1,066.40		.157
Labor.....		2,232.92		.329
Supervision.....		577.60		.086
Total field cost.....		19,515.15		

Grading (3,040 linear feet or 3,045 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$96.80		\$0.032
Coal..... tons..	146	700.80	0.048	.229
Oil.....		63.07		.022
Miscellaneous expenses.....		73.64		.024
Subsistence.....		1,152.57		.378
Steamboat expenses.....		115.86		.038
Labor.....		3,587.42		1.178
Supervision.....		313.12		.103
Total field cost.....		6,103.28		

Paving, rock and concrete (3,040 linear feet or 2,908 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Mobilization and demobilization.....		\$232.92		\$0.080
Stone..... tons.....	1,885	4,284.40	2.164	4.919
Cement..... sacks.....	12,696	5,903.28	6.234	2.896
Sand and gravel..... cubic yards.....	2,352	729.59	1.184	.358
Coal..... tons.....	33.35	170.75	.016	.082
Oil.....		11.50		.005
Miscellaneous expenses.....		821.31		.282
Subsistence.....		927.47		.319
Steamboat expenses.....		677.48		.232
Labor.....		2,374.82		.816
Supervision.....		500.01		.172
Total field cost.....		16,633.53		

Summary of costs (3,040 linear feet revetted).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square. ¹	Total.		
Total field cost.....	\$5.899	\$39,985.35	\$7.722	\$22,736.81	\$62,722.16	\$20.63
Office expenses.....	.087	593.78	.130	437.18	930.96	.31
Surveys.....	.059	399.85	.056	163.93	563.78	.18
Care of plant.....	.120	808.35	.158	459.65	1,268.00	.42
Repair of plant.....	.648	4,394.80	.887	2,581.04	6,975.84	2.29
Depreciation of plant.....	.347	2,349.14	.461	1,339.86	3,689.00	1.21
Total.....	7.160	48,602.87	9.434	27,718.47	76,149.74	25.04

¹ Cost per square completed upper bank work.

Natchez front.—No work was done during the year. The expenditures amounting to \$693.64 were for surveys and miscellaneous.

The field work was in charge of Asst. Engineer E. B. Geddes, assisted by Junior Engineer Geo. C. Schoenberger and Supt. J. R. Allen.

Condition at end of present year.—In Giles Bend a total of 20,917 linear feet of bank is protected by subaqueous mattress of willow and stone, 17,340 feet of upper bank are paved, and a spur levee 16,621 feet long has been built to commission grade on the axis of Cowpen Neck. Slight caving has occurred in the upper portion of the bend. The work has been successful in preventing a threatened cut-off between Giles and Cowpen Bends, although numerous failures of the revetment have occurred and a considerable portion of the spur levee was destroyed by caving of the bank and had to be replaced. The work, as far as can be determined, is in fairly good condition, except for the caving in the upper portion of the bend. In Marengo Bend the bank has been protected for 12,844 linear feet with a standard revetment, all of which is believed to be in good condition. On the Natchez front the bank has been protected with standard revetment for 3,536 linear feet in two detached pieces; upper 2,136 feet long, and lower 1,400 feet long, separated by an unprotected gap of about 1,600 feet. Further loss of bank on the harbor front has been prevented and the site of the city waterworks preserved. The project for improving the harbors at Natchez and Vidalia, Miss. and La., has not been completed, as the several revetments require further extension as well as maintenance of existing work.

Total expenditures on existing project in Giles Bend were \$1,296,587.54 for new work, and \$438,068.19 for maintenance, making a total of \$1,734,655.73. In Marengo Bend \$381,857 for new work, and \$84,041.02 for maintenance, making a total of \$465,898.02. On the Natchez front \$120,730.26 for new work, and \$5,758.22 for maintenance, making a total of \$126,488.48. Grand total for improving harbors at Natchez, Miss., and Vidalia, La., \$1,799,174.80 for new work

and \$527,867.48 for maintenance, making a grand total of \$2,827,042.28. The project has not yet been completed.

Local cooperation.—None.

Proposed operations.—To restore to its original length and maintain the revetment in Giles Bend and to maintain the spur levee. To maintain and extend the revetment in Marengo Bend and to close the gap between the upper and lower revetments on the Natchez front.

Effect of improvement.—The effect of the improvement has been to correct, permanently locate and deepen the channel, to protect the banks of the river, to preserve generally the controlling levee line, to prevent a cut-off between Giles and Cowpen Bends, and to preserve the harbor front and waterworks of the city of Natchez.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1917, exclusive of receipts from sales, etc., formerly included:

New work.....	\$1,799,174.80
Maintenance.....	512,711.07
Total expended.....	2,311,885.87
Total appropriations to June 30, 1917.....	2,418,500.00

Fiscal year ending June 30.	1913	1914	1915	1916	1917
Expended for new work.....	\$225,280.10	\$322,165.54	\$8,373.42	\$57,485.66	.....
Expended for maintenance.....	21,980.70	17,153.68	56,133.10	78,590.61	\$163,066.76
Total expended.....	247,260.80	339,319.17	64,506.52	136,076.27	163,066.76
Appropriated or allotted.....	338,500.00	67,000.00	183,000.00	200,000.00	.....

July 1, 1916, balance unexpended..... \$69,680.89

Amount allotted from river and harbor act approved July 27, 1916..... 200,000.00

269,680.89

June 30, 1917, amount expended during fiscal year, exclusive of receipts from sales, for maintenance..... 163,066.76

July 1, 1917, balance unexpended..... 106,614.13

July 1, 1917, outstanding liabilities..... 6,677.50

July 1, 1917, balance available for fiscal year ending June 30, 1918... 99,936.63

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
June 16, 1880 (sundry civil).....		\$40,000.00
Mar. 2, 1881 (river and harbor).....		50,000.00
July 13, 1892 (river and harbor).....		80,000.00
Aug. 18, 1894 (sundry civil).....		80,000.00
June 2, 1896 (river and harbor).....	June 27, 1896	64,000.00
Mar. 3, 1899 (sundry civil).....	Mar. 13, 1899	50,000.00
June 13, 1902 (river and harbor).....	July 12, 1902	60,000.00
Mar. 2, 1903 (sundry civil).....	July 21, 1903	12,000.00
Do.....	Apr. 26, 1905	40,000.00
June 30, 1906 (sundry civil).....	June 28, 1906	50,000.00
Mar. 2, 1907 (river and harbor).....	July 12, 1907	.....
For Giles Bend.....	\$75,000.00	165,000.00
For Natchez front.....	190,000.00	
May 27, 1906 (sundry civil) for Giles Bend.....	May 4, 1907	75,000.00
Mar. 4, 1909 (sundry civil).....	Apr. 28, 1909	50,000.00
June 25, 1910 (sundry civil).....	Apr. 30, 1910	44,000.00
June 25, 1910 (river and harbor).....	July 6, 1910	130,000.00
Feb. 27, 1911 (river and harbor).....	May 3, 1911	75,000.00
July 26, 1912 (river and harbor).....	Aug. 3, 1912	.....
For Marengo Bend.....	\$165,000.00	265,000.00
For Giles Bend.....	100,000.00	

¹ Original allotment, \$100,000; \$10,000 transferred to Atchafalaya and Red Rivers, La.

Abstract of appropriations—Continued.

Act of Congress.	Alotted.	Amount.
Mar. 4, 1913 (river and harbor).....	Apr. 30, 1913	
For Marengo Bend.....		
For Giles Bend.....		
Oct. 2, 1914 (river and harbor).....	Oct. 15, 1914	
Mar. 4, 1915 (river and harbor).....	Apr. 18, 1915	
July 27, 1916 (river and harbor).....	Aug. 14, 1916	
For Marengo Bend.....		
For Giles Bend.....		
PREVENTION OF CUT-OFF AT GILES BEND.		
June 4, 1897 (sundry civil).....	July 10, 1897	
June 6, 1900 (sundry civil).....	July 14, 1900	
EMERGENCIES IN RIVER AND HARBOR WORKS—ALLOTMENT FOR "MISSISSIPPI RIVER AT GILES BEND."		
Apr. 28, 1904 (sundry civil).....	July 6, 1904	
Oct. 2, 1914 (river and harbor).....	Oct. 15, 1915	
For Marengo Bend.....		
For Giles Bend.....		
For Natches front.....		
Grand total.....		

¹ Original allotment, \$244,000; \$10,500 transferred to Bondurant and \$10,000 to Giles Bend.

² By transfer, \$123,000.

³ Original allotment, \$150,000; \$40,000 transferred to harbor at New Orleans.

⁴ Original allotment, \$15,000; \$10,000 transferred to Natches and Vidalia Harbors, Miss. and La.

Contracts in force.—None.

(c) *Junction of the Mississippi, Red, and Atchafalaya Rivers.*

Location.—Seven hundred and sixty-four miles below Cairo, right bank.

Original condition.—Prior to 1831, the Red River entered the Mississippi and the Atchafalaya flowed out from the Mississippi near the apex of a long horse-shoe-shaped bend. In 1831 the Shreve cut-off was made across the narrow part of the peninsula forming the interior of the horseshoe bend, and left the mouth of Red and head of the Atchafalaya in a lake with a precarious and uncertain connection with the Mississippi River. In the course of time, the entrance to and channel through this lake, known as Old River, became greatly obstructed during low water by sand bars and shoals. In addition to this, the channel of the Atchafalaya, forced to carry all of Red River, augmented during floods in the Mississippi by water from the latter stream, commenced to enlarge with great rapidity, until there was an apprehension that the Mississippi would desert its present channel and flow to the Gulf of Mexico via the Atchafalaya.

Previous projects.—The project adopted by act of June 18, 1878, provided for maintaining a navigable channel during low water between the Mississippi, Red, and Atchafalaya by means of dredging and washing the channel with tugboats and a sternwheel steamboat. The act of August 2, 1882, transferred the supervision of the work to the Mississippi River Commission. The modified project adopted in 1896-97, provided for the construction of six low relief dams across the Atchafalaya near Simmesport, La., to prevent the further enlargement of that stream; the construction of a dam across Old River between the mouth of Red and head of the Atchafalaya; the reopening of a channel to the Mississippi River by way of Upper Old River, and the maintenance of navigation during low water by dredging. In 1897 this project was modified to provide only for the maintenance of navigation by dredging, and for maintenance of the sill dams already built, Nos. 1 and 3. Prior to 1897, the dam across Old River had been destroyed, first by making a cut through it and subsequently by the current of the river.

Present project.—The present project, adopted in 1897 by the Mississippi River Commission, provides for the securing of low-water navigation between the Mississippi, Red, and Atchafalaya Rivers by dredging; the maintenance of

sill dams Nos. 1 and 3 in the Atchafalaya; and to repair, care for, and improve the hydraulic dredge, *The Ram*, belonging to the work.

Operations and results prior to the present year.—The maintenance of low-water navigation between the Mississippi, Red, and Atchafalaya Rivers by various means of dredging was prosecuted with varying degrees of success until 1893, since which time operations have been successful, due to the efficiency of the dredge *The Ram*, constructed in that year. Two sill dams, Nos. 1 and 3, had been placed in the Atchafalaya just below the mouth of Bayou des Glaizes, and a dam across Old River between the mouth of Red and head of the Atchafalaya had been built, but was afterwards cut. Some work in the direction of opening up Upper Old River was done. The effect of the work was to secure uninterrupted low-water navigation since 1893, and to prevent the further enlargement of the Atchafalaya. Amounts spent for original work and for maintenance were \$872,332.35 and \$301,066.99, respectively, a total of \$1,273,419.34.

Operations and results during the present year.—The subproject for work was to do such dredging as might be necessary to maintain low-water navigation between the Mississippi, Red, and Atchafalaya Rivers through Lower Old River, to repair and maintain the sill dams in the Atchafalaya and to repair and care for the hydraulic dredge, *The Ram*. All work was done by day labor.

The river having fallen to a stage of 16 feet on the Red River Landing gauge, and there being but 9 feet of water in the channel over the bar at the entrance to Old River, dredging by the hydraulic dredge *The Ram* was commenced August 21, 1916, and continued with short intermissions until October 23, 1916, by which time a rise in the Mississippi rendered further dredging unnecessary. Navigation was not obstructed during the year. The lowest reading of the Red River Landing gauge was 5.4 feet. The total length of the channel dredged was 1,200 feet, and the total excavation was about 100,418 cubic yards. During the year 54 pontoons were built, a new dredging pump was installed, and the dredge fitted with a new suction and discharge pipe, new smoke stacks, and other repairs. The dredge was also operated at Memphis, Tenn., and on a hydraulic fill at Grand Bay, La.

So far as is known, the sill dams in the Atchafalaya remain in good condition.

The usual hydrographic survey of Old River and over the sill dams in the Atchafalaya has been made. The results show a continued enlargement of Old River and marked scour above, between, and below the sills, due to the extreme flood of 1916. The cost of survey work was \$2,051.43.

Tables of average areas and widths, maximum and means depths of Old River, referred to a plane 35 feet above the zero of the Barbres gauge, have been compiled and are consolidated and tabulated as follows:

COMPARISONS, 1894 AND 1915.

	Average area.	Average width.	Average maximum depth.	Average mean depth.
	Sq. ft.	Feet.	Feet.	Feet.
1894.....	20,933	792	46.8	26.7
1915.....	27,201	784	55.7	34.8
Increase.....	6,268	18	8.9	8.1

COMPARISONS, 1915 AND 1916.

	27,201	784	55.7	34.8
1915.....	20,933	792	46.8	26.7
1916.....	29,146	792	59.3	36.9
Increase.....	1,945	8	3.6	2.1

¹ Decrease.

The field work was in charge of Asst. Engineer H. S. Douglas.

8614 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

The amount expended from June 1, 1916, to May 31, 1917, is \$22,390.21, distributed as follows:

Dredging-----	\$7,352.48
Surveys-----	2,051.43
Equipment-----	885.32
Repairs to plant-----	11,353.01
Overhead-----	747.97
Total-----	22,390.21
Depreciation of plant-----	757.00
Gross total-----	23,147.21

Condition at end of present year.—The work consists of two large brush and stone sill dams in the Atchafalaya to restrict its outlet capacity, and the maintenance by dredging of low-water navigation between the Mississippi, Red, and Atchafalaya Rivers. The work has been successful, and the sill dams, so far as is known, are in good condition. The work is not susceptible of permanent completion, as annual dredging at low water is necessary to remove the deposits made during high water and the sill dams will have to be maintained.

Total expenditures on existing project were \$672,832.35 for new work and \$623,477.30 for maintenance, making a total of \$1,296,309.65. The project is not susceptible of completion.

Local cooperation.—Prior to the United States assuming charge of this work in 1878, the State of Louisiana had endeavored to maintain navigation. Owing to lapse of time, the amount expended by the State is unobtainable.

Proposed operations.—To secure low-water navigation by means of dredging and to maintain the sill dams in the Atchafalaya.

Effect of improvement.—Low-water navigation between the Mississippi, Red, and Atchafalaya has been maintained, and the further enlargement of the Atchafalaya has been prevented.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1917, exclusive of receipts from sales, etc., formerly included:

New work-----	\$672,832.35
Maintenance-----	608,234.16

Total expended-----	1,280,566.51
Total appropriations to June 30, 1917-----	1,280,790.00

Fiscal year ending June 30.	1913	1914	1915	1916	1917
Expended for maintenance-----	\$15,963.14	\$7,668.23	\$5,990.72	\$34,781.15	\$21,977.32
Appropriated or allotted-----		26,000.00	20,000.00	15,000.00	

July 1, 1916, balance unexpended-----	\$7,200.81
Amount allotted from river and harbor act approved July 27, 1916---	15,000.00

22,200.81

June 30, 1917, amount expended during fiscal year, exclusive of receipts from sales, for maintenance-----	21,977.32
---	-----------

July 1, 1917, balance unexpended-----	223.49
July 1, 1917, outstanding liabilities-----	10.25

July 1, 1917, balance available for fiscal year ending June 30, 1918--	213.24
--	--------

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
June 18, 1878 (river and harbor).....		\$180,000.00
Mar. 3, 1879 (sundry civil).....		40,000.00
July 4, 1884 (river and harbor).....	Aug. 5, 1884	11,500.00
Do.....	(⁵)	10,500.00
Do.....	(⁶)	1,400.00
Do.....	Aug. 19, 1884	15,000.00
RECTIFICATION OF RED AND ATCHAFALAYA RIVERS.		228,290.00
Aug. 5, 1886 (river and harbor).....		187,500.00
Aug. 11, 1888 (river and harbor).....		250,000.00
Sept. 19, 1900 (river and harbor).....	Oct. 15, 1900	217,000.00
Do.....	(⁷)	8,000.00
July 13, 1902 (river and harbor).....		80,000.00
Aug. 18, 1904 (sundry civil).....		70,000.00
June 3, 1906 (river and harbor).....	June 27, 1906	40,000.00
Mar. 3, 1909 (sundry civil).....	Mar. 13, 1909	25,000.00
June 13, 1902 (river and harbor).....	July 12, 1902	15,000.00
Do.....	Oct. 17, 1904	1,000.00
Mar. 3, 1906 (sundry civil).....	Apr. 26, 1906	24,000.00
May 27, 1908 (sundry civil)..... (\$1,500)	Nov. 3, 1908	(⁸)
Do.....	(⁹)	10,000.00
Mar. 4, 1908 (sundry civil).....	Apr. 28, 1909	25,000.00
June 25, 1910 (sundry civil).....	Apr. 30, 1910	15,000.00
July 25, 1912 (river and harbor).....	Aug. 3, 1912	10,000.00
Mar. 4, 1913 (river and harbor).....	Apr. 30, 1913	10,000.00
Do.....	(¹)	10,000.00
July 27, 1916 (river and harbor).....	Aug. 14, 1916	15,000.00
EMERGENCIES IN RIVER AND HARBOR WORKS—OLD RIVER.		1,007,500.00
Mar. 3, 1906 (river and harbor).....	Oct. 5, 1906	6,000.00
Do.....	Nov. 12, 1908	4,000.00
		10,000.00
Oct. 2, 1914 (river and harbor).....	Oct. 15, 1914	15,000.00
Mar. 4, 1918 (river and harbor).....	Apr. 18, 1915	20,000.00
		35,000.00
Grand total.....		1,280,790.00

¹ Original allotment, \$12,290; \$900 transferred to harbor at New Orleans.

² By transfer.

³ Original allotment, \$225,000; \$8,000 transferred to harbor at New Orleans.

⁴ \$2,500 expended improving Bayou des Glaises.

⁵ Original allotment, \$1,500; transferred to plant, fourth district.

⁶ Original allotment, \$25,000; \$10,000 transferred to Kempe Bend revetment.

⁷ Original allotment, \$30,000; \$10,000 transferred to Barataria levee district.

Contracts in force.—None.

(f) *Grand Bay.*

Location.—Eight hundred and eight miles below Cairo, right bank.

Original condition.—Caving of the river banks at this locality had been in progress for many years, but the exact date is unknown. Within recent years caving became more and more active until the dikes (levees) across the lower end of False River were threatened. The destruction of these dikes would have probably entailed the building of a long and costly line of levee around False River and the abandonment to overflow of a large area of cultivated land.

Previous projects.—None.

Present project.—The project adopted August 21, 1916, provides for the protection of the caving bank for a distance of about 10,000 linear feet with mattresses 400 feet wide of brush and stone, the upper bank to be graded to a slope of at least 1 in 4 and paved with rock to the top of the bank.

Operations and results prior to the present year.—None.

Operations and results during the present year.—The work originally projected for the present year was to revet the caving bank at Grand Bay for a distance of 5,000 linear feet with mattresses 300 feet wide and the conventional upper-bank grading and paving. The project was drawn while the sur-

vey was in progress. When the survey was platted unusual conditions were found to exist, the line of deepest water being much farther away from bank than had been anticipated. A revision of the project became necessary and as finally executed provided for mattresses 400 feet wide, the grading the upper bank to a slope of at least 1 in 4, and paving to the top of the bank. This work was much more expensive than that originally projected and the length of revetted bank had to be reduced. The upper bank was the most troublesome this district has had to deal with, that portion near the water edge being composed of quicksand or ooze that would not support the weight of the rock pavement. As a result a mattress had to be built to cover the quicksand and the rock pavement laid over it. Construction of mattresses was commenced October 19, 1916. Sinking of mattresses 400 feet wide commenced November 20, 1916, and completed December 30, 1916. The paving of the upper bank was delayed by scarcity of rock, due to the nationwide shortage, and was not completed until January 28, 1917. The pavement in places 236 feet wide and nowhere less than 105 feet. All work was done by hired labor with Government plant.

A total of 10,542 squares of mattress were placed and 5,027 squares of the bank were paved. The revetment was 3,180 linear feet in length, and detailed cost is set forth in the accompanying tables:

GRAND BAY (FOURTH DISTRICT).

Mattresses, total area 10,541.9 squares (channel mats, 100 per cent).

BUILDING MATS.

Items.	Quantity used.		Percentage.
	Total quantity.	Total cost.	Quantity.
Mobilization and demobilization.....		\$1,114.80	
9-inch nails.....pounds..	15,800	581.00	1.5
6-inch nails.....do.....	25,500	932.79	2.72
4-inch nails.....do.....	6,500	200.00	.66
Lumber.....	511,578	7,996.24	48.56
Wire, No. 10.....pounds..	12,400	472.50	1.20
Treenails, 1-inch.....number.	12,000	51.00	1.17
Treenails, 1/2-inch.....do.....	75,500	157.00	7.0
Brush and poles.....cords..	10,850	7,805.78	1.08
Rope, manila.....pounds..	2,825	504.25	.27
Oil.....		121.00	
Miscellaneous expenses.....		600.86	
Subsistence.....		3,083.63	
Steamboat expenses.....		2,828.00	
Labor.....		5,479.37	
Supervision.....		1,026.51	
Total field cost.....		33,596.63	

BALLASTING AND SINKING.

Mobilization and demobilization.....		\$1,827.43		
1/2-inch strand.....pounds..	7,200	367.20	0.7	
9-inch nails.....do.....	3,600	118.80	.34	
6-inch nails.....do.....	3,500	115.50	.33	
4-inch nails.....do.....	400	12.20	.04	
Lumber.....	24,374	347.32	2.3	
Wire, No. 10.....pounds..	4,000	140.00	.38	
Clips, 1/4-inch.....	128	9.45	.012	
Stone.....tons..	8,016.74	17,591.12	.76	1.1
Rope, manila.....pounds..	2,825	504.25	.27	
Oil.....		80.92		
Miscellaneous expenses.....		1,051.08		
Subsistence.....		4,413.64		
Steamboat expenses.....		2,011.00		
Labor.....		6,225.17		
Supervision.....		782.39		
Total field cost.....		35,551.49		

Grading (5,027.6 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Rope, manila.....pounds..	565	\$100.85	0.112	\$0.0200
Coal.....tons..	267.2	1,468.80	.073	.2921
Oil.....		109.17		.0209
Miscellaneous expenses.....		523.35		.0006
Subsistence.....		1,802.41		.2749
Steamboat expenses.....		164.00		.0326
Labor.....		5,300.71		1.0722
Supervision.....		647.00		.1287
Total field cost.....		9,786.29		

Paving, rock and concrete (5,027.6 squares).

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Stone.....tons..	11,407.29	\$25,081.02	2.27	\$4.9787
Rope, manila.....pounds..	2,825	504.21	.56	.1008
Oil.....		10.00		.0019
Miscellaneous expenses.....		820.46		.1649
Subsistence.....		1,643.18		.3278
Steamboat expenses.....		781.00		.1565
Labor.....		6,818.92		1.3568
Supervision.....		780.10		.1512
Total field cost.....		36,382.89		

Summary of costs (\$3,180 linear feet revetted).

	Subaqueous work.		Upper bank work.		Grand total.	Total cost per linear foot.
	Per square.	Total.	Per square.	Total.		
Total field cost.....	\$6.56	\$69,150.12	\$9.18	\$46,169.18	\$115,319.30	\$26.26
Office expenses.....	.08	539.65	.11	559.77	1,399.42	.44
Surveys.....	.07	790.80	.10	530.85	1,327.16	.43
Care of plant.....	.16	1,782.80	.28	1,175.20	2,958.00	.92
Repair of plant.....	.93	9,832.13	1.11	6,574.76	16,406.89	5.17
Depreciation of plant.....	.36	3,786.00	.50	2,524.00	6,310.00	1.98
Total.....	8.16	86,197.00	11.23	57,533.77	143,730.77	45.19

The field work was in charge of Asst. Engineer H. S. Douglas, assisted by Junior Engineers G. D. Waddill and John W. Whitty.

Condition at end of present year.—A total of 3,180 linear feet of bank is protected with mattresses 400 feet wide, and a pavement of rock extending to the top of the bank. Over the stretch thus protected the bank has been made reasonably permanent and the dikes across Grand Bay and Hermitage (lower end of False River) preserved. So far as is known, the work is in good condition. The project is not completed. Total expenditures on existing project were \$141,008.63 for new work.

Local cooperation.—None.

Proposed operations.—To extend the existing revetment.

Effect of improvement.—The effect of the improvement has been to correct, permanently locate and deepen the channel, to protect the banks of the river and preserve the dikes across the lower end of False River.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1917, exclusive of receipts from sales, etc., formerly included, new work.....	\$142,565.51
Total appropriations to June 30, 1917.....	175,000.00
Fiscal year ending June 30, 1917, expended for new work.....	142,565.51
Appropriated or allotted, 1918.....	175,000.00
Amount allotted from river and harbor act approved July 27, 1916 June 30, 1917, amount expended during fiscal year, exclusive of receipts from sales, for new work.....	175,000.00
	142,565.51
July 1, 1917, balance unexpended.....	32,434.49
July 1, 1917, outstanding liabilities.....	482.06
July 1, 1917, balance available for fiscal year ending June 30, 1918	32,002.43

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
July 27, 1916 (river and harbor).....	Aug. 14, 1916	\$175,000.00

Contracts in force.—None.

(g) Plaquemine, La.

Location.—Eight hundred and fifty-four miles below Cairo, right bank.

Original condition.—Caving in this bend has been in progress from an early date, probably for 100 years or more, but the exact date is unknown. The caving had destroyed a considerable portion of the town of Plaquemine, together with several lines of levee, and threatened the Government lock at the head of Bayou Plaquemine. The bend was peculiar, inasmuch as caves or subsidence of enormous extent occurred at intervals without warning.

Previous projects.—The work originated under the river and harbor act of August 11, 1888, which provided for “ * * * securing a navigable channel 60 feet wide and 6 feet in depth, from deep water up to Plaquemine Dike, and for securing the mouth of the bayou from further caving.” The project provided for the construction of four submerged sloping spur dikes of brush and stone, placed at intervals of about 1,000 feet. In 1893 the project was modified to provide for continuous revetment of the bank with mattresses of willow brush. Up to 1902 five spur dikes had been constructed and the intervals between extensively mattressed, at a cost of \$258,516.22. Operations were suspended until 1911, when the Mississippi River Commission assumed charge of the work.

Present project.—The project adopted in 1911 provides for a continuous standard revetment of the bank in front of the Government lock and the town of Plaquemine with mattresses 400 feet wide, together with upper-bank grading and paving.

Operations and results prior to the present year.—Under the existing project, a total of 6,370 linear feet of bank has been protected with mattresses 400 feet wide and the upper bank paved with rock. A cave occurred on December 15, 1912, destroying 750 linear feet of the revetment, as well as the controlling levee line and a small portion of the town of Plaquemine. This cave has been replaced. The amounts spent for original work and for maintenance prior to the beginning of the present year were \$189,688.32 and \$36,837.01, respectively, a total of \$226,525.33. The work has been successful in preserving the Government lock. The project is completed, only annual maintenance being required.

Operations and results during the present year.—During September and October, 1916, a careful hydrographic survey was made over the protected bank. This survey developed the following conditions: A cave of the unprotected bank above had flanked and destroyed the revetment for a distance of about 500 feet by flanking. A subaqueous cave had occurred in front of the lock, apparently destroying the mattress work for a distance of over 700 feet. The cave of December, 1912, had subsided about 6 feet without apparent injury to the mattress work in front. It was planned to repair the injured revetment in front

of the lock, so far as existing funds would permit. The necessary mattresses were built, but before they could be sunk in place the river rose to a stage that rendered it impracticable to place them, and they were diverted to New Orleans Harbor. The funds expended were principally for the survey and amounted to \$1,859.85. There is material on hand for future construction valued at \$4,194.07.

Condition at end of present year.—A total of 6,370 linear feet of bank, including the Government lock and the town of Plaquemine, has been protected with a standard revetment of willow mattresses and stone. Over the stretch thus protected the bank has been made reasonably permanent and the Government lock has been preserved. The work is not in good condition, several caves having occurred, which have not been repaired. The project has been completed, but annual maintenance will be required.

Total expenditures on existing project were \$189,688.82 for new work and \$38,696.86 for maintenance, making a total of \$228,385.18.

Local cooperation.—None.

Proposed operations.—To maintain existing work.

Effect of improvement.—The effect of the improvement has been to correct, permanently locate, and deepen the channel, to protect the banks of the river, and to preserve the Government lock and the town of Plaquemine, La.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1917, exclusive of receipts from sales, etc., formerly included:

New work.....	\$189,688.82
Maintenance.....	38,696.86
Total expended.....	228,385.18
Total appropriations to June 30, 1917.....	230,000.00

Fiscal year ending June 30.	1913	1914	1915	1916	1917
Expended for new work.....	\$47,539.72	\$35,738.53	\$33,639.83	\$36,566.92	.....
Expended for maintenance.....	4,349.09	7,997.59	24,590.33	1,859.85	.....
Total expended.....	\$1,888.81	\$5,738.53	\$1,837.42	\$1,187.25	1,859.85
Appropriated or allotted.....	50,000.00	50,000.00	30,000.00	.....	.....

July 1, 1916, balance unexpended.....	\$3,474.67
June 30, 1917, amount expended during fiscal year, exclusive of receipts from sales, for maintenance.....	1,859.85
July 1, 1917, balance unexpended.....	1,614.82
July 1, 1917, balance available for fiscal year ending June 30, 1918....	1,614.82

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
Feb. 27, 1911 (river and harbor).....	May 3, 1911	\$50,000.00
July 25, 1912 (river and harbor).....	Aug. 3, 1912	50,000.00
Mar. 4, 1913 (river and harbor).....	Apr. 30, 1913	50,000.00
Oct. 2, 1914 (river and harbor).....	Oct. 15, 1914	50,000.00
Mar. 4, 1915 (river and harbor).....	Apr. 18, 1915	130,000.00
Total.....		280,000.00

¹Original allotment \$50,000; \$10,000 transferred to Lower Texas levee district and \$10,000 transferred to Arkansas levee district.

Contracts in force.—None.

(h) Harbor at New Orleans, La.

Location.—Nine hundred and sixty-five miles below Cairo, right and left banks.

Original condition.—As far back as authentic records exist, the river banks in the concave bends of the river comprised in New Orleans Harbor have been caving, destroying wharves, levees, railroad terminals, and other works of public improvement, thus obstructing commerce.

Previous projects.—In 1878 a mixed board of army and civil engineers was convened to examine and report on the means necessary to protect the wharves and harbor from the incursions of the river. By act of June 18, 1878, Congress made an appropriation to begin the work. The approved project contemplated the protection of the caving banks in the Third District Reach with mattresses constructed of fish-pole cane. Work was prosecuted until September 29, 1881, when the project was definitely abandoned, after an expenditure of \$114,564.72.

Present project.—The act of August 2, 1882, placed the work under the supervision of the Mississippi River Commission, which, on September 18, 1882, adopted a project providing for the protection of the caving bank in the Carrollton Bend with continuous mattresses of willow brush. In 1884 the project was modified to provide, in addition, for submerged sloping spur dikes of brush and stone, and the scope of the work was extended to cover the Gouldsboro Bend. In 1889 the work was extended to cover the Greenville Bend and the Third District Reach. The present project, as modified, provides for both spur dikes and continuous mattress revetment.

Operations and results prior to the present year.—The river banks have been protected as follows: In Carrollton Bend for 11,295 feet by continuous mattress, and for 2,335 feet by five spur dikes in conjunction with continuous mattresses. In Greenville Bend, near Amesville, for 11,810 feet, and at Westwego for 1,500 feet by continuous mattress. On the Gretna Front for 5,010 feet by continuous mattress. In the Gouldsboro Bend for 9,475 feet by a combination of 24 submerged sloping spur dikes and continuous revetment, and in the Third District Reach for 1,110 feet by continuous mattress, and for 12,590 feet by continuous mattress in conjunction with 16 submerged sloping dikes. A total of 55,125 linear feet was thus protected. Amounts spent for original work and for maintenance prior to the beginning of the present year were \$1,869,458.86 and \$237,614.89, respectively, a total of \$2,107,073.25. The work has been successful generally in preventing further caving of the banks over the stretches protected. The project is not yet completed, requiring the closure of the unprotected gap in the Greenville Bend and the probable placing of mattresses in the intervals between the spur dikes in the Gouldsboro Bend, together with annual maintenance of the great length of work now in place.

Operations and results during the present year.—Surveys of the Gouldsboro Bend and of the Third District Reach were made. No marked changes were developed. The work of the present year was done under many disadvantages. Some mattresses originally built for Plaquemine, La., could not be successfully sunk at that locality and were brought to New Orleans. They were sunk with considerable difficulty in the intervals between spurs 7 and 8 and 11 and 12 of the Gouldsboro series. Work was commenced January 25, 1917, and completed February 10, 1917. A total of 1,800 squares were sunk. Work was done by hired labor with Government plant. Operations were carried on during high water, and this, together with the small amount of work, made costs relatively high, as may be seen from the following tables:

NEW ORLEANS HARBOR, FOURTH DISTRICT.

Mattresses, total area 1,800 squares (channel mats, 100 per cent).

BUILDING MATS.

Items.	Quantity used.		Per square.	
	Total quantity.	Total cost.	Quantity.	Cost.
Station and demobilization.....		\$381.40		\$0.2120
mats..... pounds	2,700	82.35	1.5	.0458
mats..... do	4,900	100.55	2.72	.0559
mats..... do	1,200	35.40	.666	.02
mats..... do	76,632	1,178.01	42.57	.6550
No. 10..... pounds	1,600	60.00	.89	.0833
No. 1-inch..... number	12,000	25.30	7.0	.0140
No. 1-inch..... do	1,620	6.90	.9	.0038
wood poles..... cords	1,860	1,144.68	1.03	.6360
mats..... pounds	634	112.22	.35	.06
miscellaneous expenses.....		240.74		.1337
miscellaneous expenses.....		151.12		.1463
miscellaneous expenses.....		816.64		.4540
miscellaneous expenses.....		1,474.00		.8190
miscellaneous expenses.....		1,753.08		.9740
miscellaneous expenses.....		601.10		.3340
Total field cost.....		8,163.39		

BALLASTING AND SINKING.

Station and demobilization.....		\$632.88		\$0.3617
mats..... pounds	810	40.80	0.45	.0227
mats..... do	600	19.80	.33	.0110
mats..... do	600	19.80	.33	.0110
mats..... do	200	5.60	.11	.0057
No. 10..... pounds	2,940	33.24	1.30	.0135
No. 10..... number	900	28.25	.50	.0163
No. 1-inch..... tons	24	1.80	.013	.0010
mats..... pounds	1,350.30	2,038.95	.755	1.1328
mats..... pounds	956	172.16	.53	.096
miscellaneous expenses.....		12.57		.0072
miscellaneous expenses.....		207.99		.2111
miscellaneous expenses.....		771.78		.4287
miscellaneous expenses.....		1,067.00		.5628
miscellaneous expenses.....		2,519.49		1.3992
miscellaneous expenses.....		445.18		.2473
Total field cost.....		8,019.59		

Summary of costs (600 linear feet revetted).

	Subaqueous work.		Total cost per linear foot.
	Per square.	Total.	
Field cost.....	\$8.09	\$16,182.98	\$26.97
Miscellaneous expenses.....	.76	1,375.45	2.29
Revetment.....	.05	83.69	.14
Cost of plant.....	.16	285.00	.48
Repair of plant.....	1.14	2,046.84	3.41
Depreciation of plant.....	1.40	2,524.32	4.21
Total.....	12.50	22,498.28	34.50

Date for cost of revetment, June 1, 1916, to May 31, 1917.

Location.	Expended as per financial statement.	Debits to material on hand.	Credit by material on hand.	Total field cost.	Unit field cost.		Unit overhead cost.		Work accomplished.		Total cost of work.	Gross unit cost. ¹		Remarks.
					Per square. ²	Per linear foot.	Per square.	Per linear foot.	Squares. ²	Linear feet.		Per square.	Per linear foot.	
Hard Times Bend.....	\$52,988.80	\$2,960.10	\$18,113.11	\$34,893.99	\$6.820	\$10.970	\$0.48	\$0.76	4,906	3,060	\$37,266.80	\$7.60	\$12.22	Financial statement includes \$568.99 expended on clearing for next season's work.
Bondurant Chute.....	18,209.50	.....	4,543.00	13,001.63	9.320	18.855	.48	.81	1,365	820	13,666.50	9.80	16.67	Financial statement includes \$486.77 expended on clearing for next season's work.
Kempe Bend.....	54,701.33	9,811.26	13,723.05	48,660.75	6.702	19.560	.37	1.01	7,113	2,463	50,302.77	7.07	20.65	Financial statement includes \$486.77 expended on clearing for next season's work.
Giles Bend.....	102,964.27	{ 4,740.68 } { 116,740.00 }	3,804.21	82,821.10	6.514	20.261	.35	1.09	12,503	4,020	87,267.32	6.96	21.71	Financial statement includes cost of levee, amounting to \$32,253.42.
Marengo Bend.....	59,437.96	45,347.29	566.35	63,285.94	6.474	20.632	.10	.36	9,688	3,040	64,216.90	6.63	21.12	Subsequent revetment 400 feet wide. Paving carried to top of bank.
Grand Bay.....	141,090.75	.....	23,044.87	116,646.46	7.496	36.68	.065	.44	15,569.5	3,180	118,046.88	7.58	37.12	
New Orleans Harbor...	23,704.95	9,526.07	15,588.90	16,266.67	9.037	27.11	.764	2.29	1,800	600	17,642.12	9.80	29.40	

¹ Includes every item of field and overhead charges.

² Average unit cost mattress and paving.

³ Squares include both subaqueous and upper bank work.

⁴ Value of material used belonging to general repairs and stone.

Condition at end of present year.—A total of 55,125 linear feet of bank has been protected by continuous mattress revetment, by submerged sloping spur dikes in conjunction with continuous mattress, and by spur dikes alone. Where thus protected, the banks have been made reasonably permanent, and the destruction of wharves, railroad inclines, and other commercial facilities has been prevented. About 75 per cent of the project has been completed. There remains about 5,000 linear feet of bank to be revetted, and the intervals between the spur dikes in the Gouldsboro Bend require to be covered with continuous mattress.

Total expenditures on existing project were \$1,869,458.86 for new work and \$254,859.07 for maintenance, making a total of \$2,123,817.93. The project has not yet been completed.

Local cooperation.—The city of New Orleans undertook to protect the bank in the Third District Reach and expended \$327,417.04 for this purpose. The State of Louisiana, through the board of commissioners of the port of New Orleans, has expended \$10,000,000 for the construction of wharves and other terminal facilities. The funds expended were obtained by the sale of bonds and by local taxation.

Proposed operations.—It is proposed to close the gap in the Greenville Bend revetment with continuous mattress work, to mattress the bank in the intervals between the spurs in the Gouldsboro Bend, and to maintain existing revetments.

Effect of improvement.—The effect of the improvement has been to correct, permanently locate, and deepen the channel, to protect the banks of the river, and the commercial terminal facilities of the harbor have been rendered reasonably permanent.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1917, exclusive of receipts from sales, etc., formerly included:

New work.....	\$1,984,028.58
Maintenance.....	224,451.07
Total.....	¹ 2,208,474.65
Total appropriations to June 30, 1917.....	2,346,450.86

Fiscal year ending June 30.	1913	1914	1915	1916	1917
Expended for new work.....	\$15,500.00	\$42,525.01	\$59,060.74	\$42,813.92	.....
Expended for maintenance.....	1,722.21	2,000.00	2,327.93	12,585.85	¹ 322,420.85
Total expended.....	17,222.21	44,525.01	61,388.67	55,399.77	22,420.85
Appropriated or allotted.....	70,000.00	50,000.00	45,000.00	130,000.00	.....

July 1, 1916, balance unexpended..... \$24,688.42

Amount allotted from river and harbor act approved July 27, 1916... 130,000.00

154,688.42

June 30, 1917, amount expended during fiscal year, exclusive of receipts from sales, for maintenance..... ¹ 22,420.85

July 1, 1917, balance unexpended..... 132,267.57

July 1, 1917, outstanding liabilities..... 8,724.74

July 1, 1917, balance available for fiscal year ending June 30, 1918... 123,542.83

¹ \$5,708.64 received for wear and tear of plant and sales of blue prints not included.

Abstract of appropriations.

Act of Congress.	Allotted.	Amount
"IMPROVING HARBOR AT NEW ORLEANS, LA."		
June 18, 1878 (river and harbor).....		\$50.00
Mar. 3, 1879 (sundry civil).....		60.00
June 16, 1880 (sundry civil).....		75.00
Mar. 3, 1881 (river and harbor).....		75.00
Aug. 2, 1882 (river and harbor).....	(1)	15
Jan. 19, 1884 (river and harbor).....	(1)	1.40
July 5, 1884 (river and harbor).....	(1)	4.90
July 13, 1892 (river and harbor).....		80.00
Aug. 18, 1894 (sundry civil).....		110.00
June 3, 1896 (river and harbor).....	June 27, 1896	110.00
Mar. 3, 1899 (sundry civil).....	Mar. 13, 1899	110.00
		676.40
"IMPROVING MISSISSIPPI RIVER—NEW ORLEANS HARBOR."		
Aug. 5, 1886 (river and harbor).....		75.00
Aug. 11, 1888 (river and harbor).....		\$ 199.88
Sept. 19, 1890 (river and harbor).....	Oct. 15, 1890	90.00
Do.....	Dec. 4, 1890	10.00
Do.....	(1)	8.00
June 4, 1897 (river and harbor).....	(1)	10.00
Do.....	(1)	40.00
June 13, 1902 (river and harbor).....	July 12, 1902	95.00
Mar. 3, 1905 (sundry civil).....	Apr. 26, 1905	85.00
June 30, 1906 (sundry civil).....	June 28, 1906	10.00
Mar. 2, 1907 (river and harbor).....	July 12, 1907	100.00
May 27, 1908 (sundry civil).....	May 4, 1908	150.00
Mar. 4, 1909 (sundry civil).....	Apr. 28, 1909	100.00
June 25, 1910 (river and harbor).....	July 25, 1910	175.00
Feb. 27, 1911 (river and harbor).....	May 3, 1911	\$ 192.00
July 25, 1912 (river and harbor).....	Aug. 3, 1912	35.00
Mar. 4, 1913 (river and harbor).....	Apr. 30, 1913	\$ 70.00
Oct. 2, 1914 (river and harbor).....	Oct. 15, 1914	50.00
Mar. 4, 1915 (river and harbor).....	Apr. 18, 1915	\$ 45.00
July 27, 1916 (river and harbor).....	Aug. 14, 1916	130.00
		1,609.98
Grand total.....		2,346.48

1 By transfer.

2 Original appropriation, \$200,000; \$112 reserved by the Chief of Engineers for office expenses.

3 Original allotment, \$200,000; \$8,000 transferred to plant, fourth district.

4 Original allotment, \$30,000; \$10,000 transferred to Atchafalaya and Red Rivers, La.

5 Original allotment, \$50,000; \$5,000 transferred to surveys.

Contracts in force.—None.

(i) General repairs and stone.

The general character of operations under this allotment renders it impracticable to give data as to location, original condition, previous and present projects, etc.

The allotment is intended to cover unforeseen contingencies on the several works throughout the district and the purchase of stone. Amount spent up to the beginning of the present year was \$70,194.71. The work comes under the general project for improving the Mississippi River. An allotment of \$23,865.14 was made during the present year, and there was a balance of \$19,805.29 on hand from previous allotments.

During the period covered by this report, \$23,865.14 was expended for the purchase of stone for New Orleans Harbor, for Plaquemine, La., for concrete ballast, and for administration.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1917, exclusive of receipts from sales, etc., formerly included:

New work.....	\$39,318.
Maintenance.....	55,294.
Total expended.....	94,612.
Total appropriations to June 30, 1917.....	113,000.

Fiscal year ending June 30.	1913	1914	1915	1916	1917
Expended for new work.....		\$12,066.56	\$15,173.65	\$12,043.06	
Expended for maintenance.....	\$3,724.02	4,941.90	1,023.13		\$24,418.06
Total expended.....	2,724.02	17,041.53	16,206.78	12,043.06	24,418.06
Appropriated or allotted.....		20,000.00	25,000.00	25,000.00	

July 1, 1916, balance unexpended..... \$19,805.29
 Amount allotted from river and harbor act approved July 27, 1916.. 23,000.00

42,805.29

June 30, 1917, amount expended during fiscal year, exclusive of receipts from sales, for maintenance..... 24,418.06

July 1, 1917, balance unexpended..... 18,387.24

July 1, 1917, outstanding liabilities..... 730.62

July 1, 1917, balance available for fiscal year ending June 30, 1918.. 17,656.62

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
Feb. 27, 1911 (river and harbor).....	May, 2, 1911	\$25,000.00
July 25, 1913 (river and harbor).....	Aug. 3, 1912	20,000.00
Oct. 2, 1914 (river and harbor).....	Oct. 15, 1914	20,000.00
Mar. 4, 1915 (river and harbor).....	Apr. 15, 1915	25,000.00
July 27, 1916 (river and harbor).....	Aug. 14, 1916	23,000.00
Total.....		113,000.00

Contracts in force.—None.

II. LEVEES.

(a) Lower Tensas levee district.

Location.—The Lower Tensas levee district extends on the right bank, in continuation of the Upper Tensas levee district, from a point opposite Warren-ton, Miss., 607 miles below Cairo, to the mouth of Red River, 764 miles below Cairo, with a river frontage of 157 miles and an area of 2,080 square miles. The levee line is continuous from the upper end of the district down to Point Breeze, 755 miles below Cairo. The total length of levee line is 157.29 miles, of which 150.34 miles have been built.

Original condition.—Originally there were no levees and the country was subject to overflow. The first levees were built by riparian owners under a Spanish law which required each riparian owner to build a levee. Gradually the work was taken over by the State authorities. The flood of 1882 caused many crevasses and practically destroyed the old levee line.

Previous projects.—None.

Present project.—The present project is to build and enlarge the levees to a grade and section sufficient to protect the basin against overflow. This project was adopted in 1882. It has been modified from time to time, and at present contemplates the enlargement of the existing levee line in cooperation with the State and local levee boards to a grade 3 feet above the deduced confined flood of 1912, with a section having a crown of 8 feet width, river slope 1 on 3, land slope 1 on 3 to 8 feet below crown, and thence a banquet of varying widths from 20 to 40 feet, dependent on the height of the levee.

Operations and results prior to the present year.—Under the present project work has consisted in building new levees, enlarging and repairing existing levees, and protecting levees during floods. The work has been successful in protecting the basin against overflow from ordinary floods. Protection against extreme floods has not been provided, as the levees have not been completed. As work has progressed on the project a constantly increasing amount of protection has been afforded by the levees. Previous to 1882 gaps existed in the

levee line at Diamond Island, Bougere, and Black Hawk to Red River. The Diamond Island gaps were closed in 1889. The Bougere gap was closed by a levee 2½ miles long, connecting with the Texas & Pacific Railway embankment, which served as a levee for a distance of 4.8 miles to Union Point. This gap was closed in 1902. The levee line was extended from Black Hawk to Point Breeze in 1905. During the flood of 1908 the Texas & Pacific Railway embankment and the levees built by local authorities were destroyed. In 1910 the Bougere Levee from Ashland to Union Point was completed. Crevassees in the levee line have occurred as follows:

1882 (numerous small) important	49
1884	59
1890	3
1897	1
1903	1
1913	1
1916	1

Except as above noted, the uncompleted system has protected the basin from floods. The amounts spent for new work and for maintenance prior to the beginning of the present fiscal year are \$4,492,214.23 and \$488,832.52, respectively, a total of \$4,981,046.75.

Operations and results during present year.—Construction has been continued by contract and by hired labor. The work under construction and the progress thereon is shown in the following table and has resulted in increased protection against floods:

Name of levee.	Kind of work.	Miles below Calro.	Length.	Average height.	In contract.
			<i>Feet.</i>	<i>Feet.</i>	<i>Cubic yards.</i>
Dunn.....	Enlargement..	611.5 R.	3,700	21.6	101,989.56
Hodge.....	do.....	613.5 R.	4,493	22.1	89,952.14
Hunter.....	do.....	614 R.	3,600	24.6	87,094.20
Diamond Island.....	do.....	614.5 R.	3,300	24.9	91,426.46
Shelulah.....	do.....	615 R.	4,360	25.1	108,676.81
Bayou Roundaway.....	do.....	616 R.	7,900	16.1	89,864.57
Dahlia.....	do.....	619 R.	5,900	22.1	101,265.43
Davis Island.....	New and enlargement.	624 R.	730	17.4	20,044.97
Point Pleasant.....	Enlargement..	624 R.	1,400	22.0	33,630.08
Buck Ridge.....	New.....	630 R.	3,908	17.0	277,062.70
White Oak Lake.....	Enlargement..	630-32 R.	17,186	24.0	61,051.07
White Oak Lake, lot 1.....	do.....	630 R.	4,913	22.1	138,948.73
Hard Times, lot 1.....	do.....	632 R.	3,533	24.0	98,713.96
Kempe.....	New and enlargement.	656 R.	4,328	23.0	150,000.00
Kempe, lot 2.....	Enlargement..	658 R.	5,871	21.0	124,833.23
L'Argent.....	New.....	668 R.	5,650	7.0	40,285.24
Total.....					1,603,379.17

Name of levee.	Placed during year.	Paid for during year.	Price per cubic yard.	Cost.	Required to complete.
	<i>Cubic yards.</i>	<i>Cubic yards.</i>	<i>Cents.</i>		<i>Cubic yards.</i>
Dunn.....	46,981.27	50,808.48	14.98	\$7,611.26	50,008.29
Hodge.....	3,277.56	3,277.56	23.49	765.95	50,674.58
Hunter.....	16,513.17	7,900.68	20.90	1,665.66	70,521.12
Diamond Island.....			24.70		81,426.46
Shelulah.....			25.70		108,676.81
Bayou Roundaway.....	42,937.80	29,506.68	16.40	4,539.09	26,620.77
Dahlia.....	15,784.43	21,315.46	17.47	3,723.81	
Davis Island.....	20,044.97	20,044.97	32.00	6,414.40	
Point Pleasant.....	33,630.08	33,630.03	11.71	3,939.81	
Buck Ridge.....	122,242.70	122,242.70	26.04	31,822.00	
White Oak Lake.....	33,251.25	33,214.25	42.90	14,248.91	17,799.83
White Oak Lake, lot 1.....	17,931.72	20,043.33	16.70	3,347.24	
Hard Times, lot 1.....	37,475.08	38,226.26	17.37	6,639.90	
Kempe.....			31.50		150,000.00
Kempe, lot 2.....	98,721.27	103,858.39	21.00	21,810.27	
L'Argent.....	40,285.24	40,285.24	16.00	6,445.64	
Total.....	520,076.43	524,424.04		113,284.44	569,737.35

¹ Field cost by hired labor.

	Location.			Location.	
	Point Pleasant.	Buck Ridge.		Point Pleasant.	Buck Ridge.
Machine—Beauregard:			Machine—Beauregard—Contd.		
Mobilization.....	\$1,066.38	\$4,649.66	Surveys.....	\$29.92	\$70.00
Clearing.....		144.50	Depreciation.....	1,166.67	4,666.67
Drainage.....	132.60	244.48	Overhead.....	127.12	281.55
Plowing.....	207.50	1,041.21			
Operation.....	1,221.12	21,839.27	Total cost.....	5,233.10	36,880.22
Repairs.....	423.19	3,294.10			
Dressing.....	180.60	562.56	Handled.....yards.	33,630.03	122,242.70
Sodding.....	78.60	56.22	Cost per yard.....cents.	15.50	30.17

On April 26, 1917, the Vicksburg gauge reached 49.9 feet, a stage which rendered it necessary to adopt precautionary measures for high-water protection. Patrols were placed on the levee line and barges, loaded with material, were placed at intervals along the levee.

The cost of high-water protection was \$2,276.48.

Work was done by contract and by hired labor. Work on the various levees was commenced and finished as follows:

Name of levee.	Miles below Cairo.	Work commenced.	Work finished.	Remarks.
Dunn.....	611.5 R.	May 24, 1916		Under construction.
Hodge.....	613.5 R.	June 10, 1916		Do.
Hunter.....	614 R.	Aug. 14, 1916		Do.
Diamond Island.....	614.5 R.			Work not begun.
Steinhilsh.....	615 R.			Do.
Bayou Roundaway.....	616 R.	Oct. 26, 1915		Under construction.
Dahl.....	619 R.	Feb. 26, 1915	Sept. 20, 1916	
Davis Island.....	624 R.	Nov. 2, 1916	Jan. 15, 1917	
Point Pleasant.....	624 R.	Sept. 26, 1916	Oct. 14, 1916	Done by hired labor.
Buck Ridge.....	630 R.	Apr. 6, 1916	Sept. 16, 1916	Do.
White Oak Lake.....	630 R.	Nov. 16, 1916		Under construction.
White Oak Lake, lot 1.....	630-32 R.	Nov. 21, 1914	Nov. 15, 1916	
Hard Times, lot 1.....	632 R.	Aug. 1, 1915	Aug. 31, 1916	
Kempe.....	668 R.			Work not begun.
Kempe, lot 2.....	668 R.	Jan. 1, 1916	Nov. 3, 1916	
L'Argent (sublevee).....	660 R.	Nov. 21, 1916	Apr. 14, 1917	

The total work done by the United States and local authorities is as follows:

	Cubic yards.
Constructed by the United States.....	529,076
Constructed by local authorities.....	1,104,699

Total constructed during the year.....	1,633,775
Percentage of work done by the United States.....	32.4

The result has been to give added protection against floods. The completed levee line is 14.55 miles in length.

Condition at end of present year.—The following is the condition of the levee at the end of the present year (May 31, 1917):

Project for earthwork.....per cent completed..	67.8
Miles in system.....	157.29
Miles built.....	150.34
Yardage lost during year.....	775,957
Contents of levee (May 31, 1917).....cubic yards..	80,951,973
Required to bring levees to grade and section.....do.	14,673,000
Required to bring levees to grade and section and to construct new levees, which will become necessary within the next five years.....cubic yards..	15,590,000

¹ Does not include 28,000 cubic yards in a drainage ditch.

² Does not include 928,721 cubic yards under contract, of which 683,003 cubic yards are new work.

3628 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Miles of levee above highest water:

Less than 1 foot.....	6.82
From 1 to 2 feet.....	20.33
From 2 to 3 feet.....	56.85
From 3 to 4 feet.....	28.36
From 4 to 5 feet.....	16.32
Miles of levee up to full grade, but deficient in section.....	9.11
Miles of levee up to full grade and section.....	14.55

Local cooperation.—Local authorities have expended, in part and between 1882 and January 1, 1917, \$3,557,678.12 in building, improving, and maintaining the levee line. Other expenditures since 1882, and heavy ones previous thereto, are known to have been made, but no accurate record of them has been discovered.

Proposed operations.—The project is 82.2 per cent uncompleted. The work proposed for the next year consists of completing work under contract and in extending the completed line, nearly as practicable, continuously downstream. The object of this work is to secure the levee line at its head.

Effect of improvement.—The effect of the improvement is to give an increasingly reliable protection against floods. The work can not be allowed to remain without further operations. Complete protection is not yet afforded, and any delay may cause serious damage.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1917, exclusive of receipts from sales, etc., formerly included:

New work.....	\$4,756,799.70
Maintenance.....	408,635.60

Total expended.....	5,165,435.30
Total appropriations to June 30, 1917.....	5,588,950.50

Fiscal year ending June 30.	1913	1914	1915	1916	1917
Expended for new work.....	\$103,467.06	\$579,918.88	\$162,846.41	\$150,506.89	\$134,457.52
Expended for maintenance.....	26,579.06	88,823.97	.....	30,316.34	2,343.68
Total expended.....	130,046.16	688,742.85	162,846.41	180,823.23	136,801.15
Appropriated or allotted.....	416,500.00	276,000.00	248,000.00	334,000.00	.....

July 1, 1916, balance unexpended.....	\$231,346.85
Amount allotted from river and harbor act, approved July 27, 1916.....	324,000.00

June 30, 1917, amount expended during fiscal year, exclusive of receipts from sales:	555,346.35
For new work.....	\$184,487.52
For maintenance.....	2,348.68
	186,831.15

July 1, 1917, balance unexpended.....	418,515.20
July 1, 1917, outstanding liabilities.....	\$70,869.24
July 1, 1917, amount covered by uncompleted contracts.....	174,997.50
	245,866.74

July 1, 1917, balance available for fiscal year ending June 30, 1918.....	178,148.46
---	------------

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
"LEVEES, TENNESAS FRONT."		
Aug. 2, 1882 (river and harbor).....		\$426,100.00
Jan. 16, 1884 (river and harbor).....		21,000.00
Do.....	(1)	3,000.00
July 6, 1884 (river and harbor).....		90,000.00
Do.....		8,710.00
Do.....	(1)	3,400.00
Do.....		1,000.00
Aug. 5, 1886 (river and harbor).....	June 16, 1886	11,100.00
Do.....	Nov. 20, 1886	15,000.00
Aug. 5, 1886 (river and harbor).....	July 7, 1887	15,000.00
Aug. 11, 1888 (river and harbor).....	Aug. —, 1887	180,000.00
	Oct. 3, 1888	\$100,000.00
		889,370.00
"PROTECTION OF LEVEES, TENNESAS FRONT."		
Aug. 5, 1886 (river and harbor).....	Mar. 4, 1887	7,000.00
Do.....	Aug. —, 1887	6,000.00
Aug. 11, 1888 (river and harbor).....	Oct. 3, 1888	10,000.00
		23,000.00
"LEVEES TENNESAS BASIN."		
Sept. 19, 1890 (river and harbor).....	Dec. 4, 1890	199,500.00
Do.....	(1)	33,475.00
Do.....		11,542.50
Do.....	(1)	1,334.75
Do.....	(1)	3,000.00
Aug. 5, 1886 (river and harbor).....	(8)	21.00
		253,873.25
"PROTECTION OF LEVEES, TENNESAS BASIN."		
Sept. 19, 1890 (river and harbor).....		9,525.00
Do.....	(1)	607.50
Do.....	(1)	70.25
Do.....	(1)	5,000.00
Do.....	(1)	5,000.00
		20,202.75
"PROTECTION OF LEVEES, FOURTH DISTRICT."		
Aug. 11, 1888 (river and harbor).....		29,311.94
"LOWER TENNESAS LEVEE DISTRICT."		
July 13, 1892 (river and harbor).....	Aug. 10, 1892	150,000.00
Mar. 3, 1893 (sundry civil).....	May 18, 1893	132,000.00
Aug. 18, 1894 (sundry civil).....		\$ 67,000.00
Mar. 2, 1895 (sundry civil).....		\$ 89,380.00
June 3, 1896 (river and harbor).....	June —, 1896	45,000.00
June 4, 1897 (sundry civil).....	Aug. 20, 1897	228,700.00
July 19, 1897 (deficiency).....	July 19, 1897	45,000.00
July 1, 1898 (sundry civil).....	Mar. 10, 1898	120,000.00
Do.....	June 29, 1898	30,000.00
Do.....	Jan. 17, 1899	3,000.00
Do.....	Jan. 24, 1899	5,000.00
Mar. 2, 1899 (sundry civil).....	Mar. 13, 1899	217,300.00
June 6, 1900 (sundry civil).....	July 20, 1900	110,000.00
June 12, 1902 (river and harbor).....	July 12, 1902	110,000.00
Mar. 3, 1903 (sundry civil).....	Nov. 25, 1903	110,000.00
Apr. 28, 1904 (sundry civil).....	June 25, 1903	110,000.00
Mar. 3, 1906 (sundry civil).....	Apr. 26, 1906	110,000.00
Mar. 3, 1906 (river and harbor).....	July 29, 1906	85,000.00
Do.....	(1)	18,932.86
June 29, 1906 (sundry civil).....	June 28, 1906	235,000.00
Mar. 2, 1907 (river and harbor).....	Mar. 27, 1907	300,000.00
May 2, 1908 (sundry civil).....	May 4, 1908	100,000.00

¹ By transfer.

² Original allotment, \$175,000; \$5,000 transferred to protection of third district; \$10,000 to protection, fourth district.

³ Original allotment, \$197,000; \$19,000 transferred to harbors at Natchez, Miss., and Vidalia, La. By transfer \$70,000.

⁴ Original allotment, \$132,000; \$65,000 transferred to Middle Tensas district.

⁵ Original allotment, \$132,000; \$40,000 transferred to Middle Tensas district, and \$2,640 to Homochitto district.

3630 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Abstract of appropriations—Continued.

Act of Congress.	Allotted.	Amount.
"LOWER TENNESSEE LEVEE DISTRICT"—continued.		
Mar. 4, 1909 (sundry civil).....	Apr. 28, 1909	\$100,000.00
June 25, 1910 (sundry civil).....	Apr. 30, 1910	160,000.00
June 25, 1910 (river and harbor).....	July 6, 1910	50,080.00
Feb. 27, 1911 (river and harbor).....	July 8, 1911	50,000.00
June 25, 1910 (river and harbor).....	(1)	12,000.00
July 25, 1912 (river and harbor).....	Aug. 3, 1912	\$ 312,500.00
Mar. 4, 1913 (river and harbor).....	Apr. 30, 1913	400,080.00
Do.....	(1)	15,000.00
Mar. 4, 1913 (river and harbor).....	(1)	500.00
Oct. 3, 1914 (river and harbor).....	Oct. 12, 1914	\$75,000.00
Mar. 4, 1915 (river and harbor).....	Apr. 18, 1915	\$ 248,000.00
July 27, 1916 (river and harbor).....	Aug. 14, 1916	\$ 324,000.00
		4,368,292.96
Grand total.....		5,583,950.80

¹ By transfer.

² Original allotment, \$320,000; \$7,500 transferred to Upper Tennessee district.

³ Original allotment, \$197,000; \$19,000 transferred to harbors at Natchez, Miss., and Vidalia, La. By transfer \$70,000.

⁴ Original allotment, \$350,000; \$26,000 transferred to Memphis Harbor.

Contracts in force.

Name of contractor.	Amount of work.	Character of work.	Unit price.	Date of approval.
E. H. Jackson.....	102,024.80	Enlargement.....	Cents. 14.98	Nov. 13
W. C. Mullen.....	89,952.14	do.....	22.40	Do.
L. E. Pickett.....	87,034.29	do.....	20.90	Do.
W. C. Mullen.....	91,428.46	do.....	24.70	Do.
Do.....	106,676.81	do.....	25.70	Do.
N. C. Williamson.....	89,864.57	do.....	16.40	Do.
Jackson Construction Co.....	51,051.07	do.....	42.90	Nov. 20
Francis T. Constant.....	150,000.00	New and enlarged.....	31.50	Do.

Name of contractor.	Date of beginning.	Date of expiration.	Percentage completed.	Levee.	Miles below Cairo.
E. H. Jackson.....	1915. Oct. 13	1916. Dec. 15	83.8	Dunn.....	611.5 R.
W. C. Mullen.....	Oct. 28	do.....	3.6	Hodge.....	613.5 R.
L. E. Pickett.....	do.....	do.....	19.0	Hunter.....	614 R.
W. C. Mullen.....	Oct. 12	do.....		Diamond Island.....	614.5 R.
Do.....	do.....	do.....		Shelulah.....	615 R.
N. C. Williamson.....	Oct. 13	do.....	70.4	Bayou Roundaway.....	616 R.
Jackson Construction Co.....	1916. Nov. 20	1917. Jan. 31	65.1	White Oak Lake.....	630-32 R.
Francis T. Constant.....	Nov. 15	1918. Jan. 5		Kempe.....	656 R.

(b) Atchafalaya levee district.

Location.—The Atchafalaya levee district extends on the right bank of the Mississippi River from Red River, 764 miles below Cairo, to Bayou Lafourche, 886 miles below Cairo, with a river frontage of 122 miles and an area of 6,035 square miles. The levee line is continuous and is 127.87 miles in length, all of which has been built.

Original condition.—Originally, there were no levees and the country was subject to overflow. The first levees were built by riparian owners under a Spanish law which required each riparian owner to build a levee. Gradually the work was taken over by the State authorities. The flood of 1882 caused many crevasses and practically destroyed the old levee line.

Previous projects.—None.

Present project.—The present project is to build and enlarge the levees to grade and section sufficient to protect the basin against overflow. This act was adopted in 1882. It has been modified from time to time and at present contemplates the enlargements of the existing levee line in cooperation with the State and local levee boards to a grade of 3 feet above the deduced flood of 1912, with a section having a crown of 8 feet width, river side 1 on 3, land slope 1 on 3 to 8 feet below crown, and thence a banquetta varying widths from 20 to 40 feet, dependent on the height of the levee.

Operations and results prior to the present year.—Under the present project, it has consisted in building new levees, enlarging and repairing existing levees and protecting levees during floods. The work has been successful in protecting the basin against overflow from ordinary floods. Protection against extreme floods has not been provided, as the levees have not been completed. Work has progressed on the project, a constantly increasing amount of section has been afforded by the levees.

In 1882 all gaps in the levee line had been closed. The following crevasses occurred:

(numerous small) important	7
.....	8
.....	13
.....	1
.....	1

Although uncompleted, the levee system has afforded complete protection for out of the preceding 27 years. The amounts spent for new work and maintenance prior to the beginning of the present fiscal year are \$1,981,783.20 and \$160,424.69, respectively, a total of \$2,142,207.89.

Operations and results during the present year.—Construction has been conducted by contract. The work under construction is shown in the following table and has resulted in increased protection against floods:

Name of levee.	Kind of work.	Miles below Cairo.	Length.	Average height.	In contract.
			<i>Feet.</i>	<i>Feet.</i>	<i>Cu. yards.</i>
River landing	Enlargement	766 R.	7,004	20.9	197,871.90
Shiland	New	766.5 R.	5,095	16.5	240,767.19
St. Louis	New and enlargement	767.5 R.	9,829	13.9	255,574.93
St. Louis	Enlargement	768.5 R.	7,140	16.2	103,853.67
St. Louis	do	769.5 R.	9,400	16.5	103,184.97
St. Louis	do	772 R.	5,800	19.0	104,168.70
St. Louis	do	773.5 R.	5,700	19.9	104,410.18
St. Louis	do	775 R.	5,500	18.0	101,616.02
St. Louis	do	775.5 R.	3,003	26.6	118,131.51
St. Louis	New and enlargement	777 R.	3,136	25.9	102,862.02
St. Louis	Enlargement	777.5 R.	3,200	22.3	105,750.09
St. Louis, lot 1	New and enlargement	778 R.		25.0	181,972.77
St. Louis, lot 2	Enlargement	780 R.	2,400	24.5	101,841.73
Total					1,925,014.68

Name of levee.	Placed during year.	Paid for during year.	Price per cubic yard.	Cost.	Required to complete.
	<i>Cu. yards.</i>	<i>Cu. yards.</i>	<i>Cents.</i>		<i>Cu. yards.</i>
River landing			13.47		197,871.90
Shiland			13.47		240,767.19
St. Louis	20,976.32		13.47		225,598.61
St. Louis	103,853.67	103,853.67	9.23	\$9,585.60	
St. Louis	103,184.97	103,184.97	9.23	9,523.98	
St. Louis	46,946.67	43,302.33	9.23	3,996.80	57,222.08
St. Louis	9,696.81	6,651.54	9.23	613.94	94,713.37
St. Louis			9.23		101,616.02
St. Louis	31,073.58	33,080.88	24.87	8,214.77	
St. Louis	33,254.01	29,126.82	16.00	4,660.29	
St. Louis	38,134.52	70,013.68	16.00	11,202.19	
St. Louis, lot 1	113,846.13	125,624.47	16.00	20,099.92	
St. Louis, lot 2			11.89		11,444.73
Total	509,966.68	514,788.36		67,897.58	929,233.86

56,063.95 cubic yards at a cost of \$9,469.55 were pumped in over the sand boils area at Grand Bay (808 R.).

All work was done by contract. Work on the various levees was commenced and finished as follows:

Name of levee.	Miles below Cairo.	Work commenced.	Work finished.	Remarks.
Red River Landing.....	766 R.			Work not begun.
Smithland.....	766.5 R.			Do.
Henrietta.....	767.8 R.	May 14, 1917		Under construction.
Letenache.....	768.5 R.	May 20, 1916	Oct. 6, 1916	
Belle Vista.....	769.5 R.	Sept. 15, 1916	Jan. 2, 1917	
Batchelor.....	772 R.	Dec. 20, 1916		Do.
Normandy.....	773.5 R.	Mar. 5, 1917		Do.
Unique.....	775 R.			Work not begun.
Longwood.....	775.5 R.	Sept. 18, 1914	Nov. 4, 1916	
Upper Cocoa.....	777 R.	Dec. 5, 1914	Sept. 3, 1916	
Lower Cocoa.....	777.5 R.	Dec. 28, 1914	Sept. 9, 1916	
Lacour:				
Lot 1.....	778 R.	Dec. 15, 1914	Mar. 22, 1917	
Lot 2.....	780 R.	May 18, 1915		Under construction.

The total work done by the United States and local authorities is as follows:

Constructed by the United States.....cubic yards... 509,967
 Constructed by local authorities.....do... 182,934

Total constructed during the year.....do... 692,901
 Percentage of work done by the United States.....73.6

The result has been to give added protection against floods. Seven and twenty-six one-hundredths miles of levee have been completed to grade and section.

Condition at end of present year.—The following is the condition of the levees at the end of the present year (May 31, 1917):

Project for earthwork.....per cent completed... 64.5
 Miles in system.....127.87
 Miles built.....127.87
 Yardage lost during the year.....214,800
 Contents of levees (May 31, 1917).....cubic yards... 25,746,683
 Required to bring levees to grade and section.....do... 13,950,500
 Required to bring levees to grade and section and to construct new levees, which will become necessary within the next five years... 15,128,000
 Miles of levee above highest water:
 Less than 1 foot.....12.73
 From 1 to 2 feet.....47.70
 From 2 to 3 feet.....23.10
 From 3 to 4 feet.....19.36
 From 4 to 5 feet.....None.
 Miles of levee up to grade, but deficient in section.....17.72
 Miles of levee up to full grade and section.....7.26

Levees built by local authorities contain earth not applying toward the completion of the project and require additional earth to be made of specified dimensions.

Local cooperation.—Local authorities have expended, in part, and between 1882 and January 1, 1917, \$10,527,733.54 in building, improving, and maintaining levee lines. Other expenditures since 1882, and heavy ones previous thereto, are known to have been made, but no account of them has been discovered.

Proposed operations.—The project is 35.5 per cent uncompleted. The work proposed for the next year consists of completing the work now in progress or under contract. The object of this work is to complete, in accordance with the subprojects, the levees which form the weakest and most troublesome portion of the line near its head.

¹ Does not include 38,700 cubic yards of earth placed in new levee at Belle Vista by the local authorities.

² Does not include 929,283 cubic yards under contract, of which 193,513 cubic yards are new work.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1917, exclusive of receipts from sales, etc., formerly included:

New work.....	\$2, 073, 990. 29
Maintenance.....	150, 067. 12
Total expended.....	2, 224, 066. 41
Total appropriation June 30, 1917.....	2, 403, 185. 56

Fiscal year ending June 30.	1913	1914	1915	1916	1917
Expended for new work.....	\$106, 345. 13	\$137, 557. 26	\$66, 418. 47	\$54, 068. 58	\$112, 137. 69
Expended for maintenance.....	989. 50	1, 825. 37		20, 338. 66	
Total expended.....	107, 314. 63	139, 382. 63	66, 418. 47	74, 397. 24	112, 137. 69
Appropriated or allotted.....	97, 500. 00	126, 000. 00	85, 000. 00	171, 075. 90	

July 1, 1916, balance unexpended.....	\$141, 256. 84
Amount appropriated by river and harbor act approved July 27, 1916.....	150, 000. 00
	291, 256. 84
June 30, 1917, amount expended during fiscal year, exclusive of receipts from sales, for new work.....	112, 137. 69
July 1, 1917, balance unexpended.....	179, 119. 15
July 1, 1917, outstanding liabilities.....	\$327. 45
July 1, 1917, amount covered by uncompleted contracts.....	148, 226. 56
	146, 554. 01
July 1, 1917, balance available for fiscal year ending June 30, 1918.....	32, 565. 14

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
"ATCHAFALAYA FRONT."		
Aug. 2, 1882 (river and harbor).....		\$110, 000. 00
Jan. 19, 1884 (river and harbor).....		5, 000. 00
Do.....		4, 000. 00
Do.....		15, 000. 00
Do.....		12, 800. 00
Aug. 3, 1886 (river and harbor).....		40, 000. 00
		176, 800. 00
"LEVEES, RIGHT BANK BELOW RED RIVER."		
Sept. 19, 1890 (river and harbor).....	Dec. 4, 1890	123, 975. 00
Do.....	(¹)	41, 562. 50
Do.....	(²)	12, 468. 75
Do.....	(³)	1, 441. 15
		179, 447. 40
"PROTECTION OF LEVEES, RIGHT BANK BELOW RED RIVER."		
Sept. 19, 1890 (river and harbor).....		6, 222. 30
"PROTECTION OF LEVEES, FOURTH DISTRICT."		
Aug. 11, 1888 (river and harbor).....		23, 663. 00
"ATCHAFALAYA LEVEE DISTRICT."		
July 13, 1892 (river and harbor).....	Aug. 10, 1892	155, 000. 00
Mar. 3, 1893 (sundry civil).....	May 18, 1893	152, 000. 00
Aug. 18, 1894 (sundry civil).....		147, 365. 96
Mar. 2, 1896 (sundry civil).....		148, 900. 00

Original allotment, \$12,000; \$9,200 transferred to Tensas front, New Orleans Harbor and mouth of Red River.

¹ By transfer.

² Original allotment, \$152,000; \$4,633.04 transferred to Pontchartrain levee district.

³ Original allotment, \$152,000; \$3,040 transferred to Homochitto levee district.

Abstract of appropriations—Continued.

Act of Congress.	Allotted.	Amount.
<i>"ATCHAFALAYA LEVEE DISTRICT"—continued.</i>		
June 3, 1896 (river and harbor).....	June —, 1896	\$28, 125.00
June 4, 1897 (sundry civil).....	Aug. 20, 1897	138, 600.00
July 19, 1897 (deficiency).....	July 19, 1897	28, 125.00
July 1, 1898 (sundry civil).....	Mar. 10, 1898	70, 000.00
Do.....	June 29, 1898	17, 000.00
Mar. 3, 1899 (sundry civil).....	Mar. 13, 1899	98, 800.00
June 6, 1900 (sundry civil).....	July 20, 1900	55, 000.00
June 13, 1902 (river and harbor).....	July 12, 1902	40, 000.00
Mar. 3, 1903 (sundry civil).....	Nov. 25, 1903	40, 000.00
Apr. 28, 1904 (sundry civil).....	July 21, 1903	40, 000.00
Mar. 3, 1905 (sundry civil).....	July 29, 1905	40, 000.00
Mar. 3, 1905 (river and harbor).....	Apr. 26, 1905	30, 000.00
June 30, 1906 (sundry civil).....	June 28, 1906	25, 000.00
Mar. 2, 1907 (river and harbor).....	Mar. 27, 1907	30, 000.00
June 25, 1910 (sundry civil).....	Apr. 30, 1910	32, 000.00
June 25, 1910 (river and harbor).....	July 6, 1910	22, 500.00
July 25, 1912 (river and harbor).....	Aug. 3, 1912	200, 000.00
Mar. 4, 1913 (river and harbor).....	Apr. 30, 1913	97, 500.00
Oct. 2, 1914 (river and harbor).....	Oct. 15, 1914	125, 000.00
Mar. 4, 1915 (river and harbor).....	Apr. 18, 1915	85, 000.00
July 27, 1916 (river and harbor).....	Aug. 14, 1916	171, 075.90
		2, 017, 052.86
Grand total.....		2, 403, 185.56

1 Original allotment, \$25,000; \$2,500 transferred to Barataria levee district.

2 Original allotment, \$150,000; \$15,500 transferred to Lower Tensas levee district, \$22,000 transferred to Barataria levee district, \$15,000 transferred to Lafourche levee district.

3 Original allotment, \$92,000; \$17,000 transferred to harbors at Natchez and Vidalia, Miss. and La. By transfer, \$10,000.

4 By transfer, Jan. 26, 1917, for construction of steel barge, \$21,075.90.

Contracts in force.

Name of contractor.	Amount of work.	Character of work.	Unit price.	Date of approval.
			<i>Cents.</i>	
Grasser Contracting Co.....	\$197,871.90	Enlargement.....	13.47	Nov. 20, 1916
Do.....	240,767.19	New.....	13.47	Do.
Do.....	255,574.93	New and enlargement.....	13.47	Do.
Gibson, Hamilton & Co.....	104,168.70	Enlargement.....	9.23	Nov. 13, 1915
Do.....	104,410.18	do.....	9.23	Do.
Do.....	101,616.02	do.....	9.23	Do.
Dameron-White Co. (Ltd.).....	104,841.73	do.....	11.89	Apr. 27, 1916

Name of contractor.	Date of beginning.	Date of expiration.	Per cent complete.	Name of levee.	Miles below Cairo.
Grasser Contracting Co.....	Apr. 1, 1917	Jan. 31, 1918		Red River Landing.....	765 R.
Do.....	do	do		Smithland.....	766.5 R.
Do.....	do	do	11.7	Henrietta.....	767.8 R.
Gibson, Hamilton & Co.....	Oct. 12, 1915	Dec. 15, 1916	15	Batchelor.....	772 R.
Do.....	do	do	9.3	Normandy.....	773.5 R.
Do.....	do	do		Unique.....	775 R.
Dameron-White Co. (Ltd.).....	Apr. 5, 1915	Feb. 1, 1916	89	Lacour, lot 2.....	780 R.

(c) Lafourche levee district.

Location.—The Lafourche levee district extends on the right bank from Bayou Lafourche, 886 miles below Cairo, to New Orleans, 964 miles below Cairo, with a river frontage of 78 miles. The Lafourche and Barataria levee districts comprise the same basin, with a total area of 2,020 square miles. The levee line is continuous, 82.14 miles in length, all of which has been built.

Original condition.—Originally there were no levees and the country was subject to overflow. The first levees were built by riparian owners under a Spanish law which required each riparian owner to build a levee. Gradually the work was taken over by the State authorities. The flood of 1882 caused many crevasses and practically destroyed the old levee line.

Previous projects.—None.

present project.—The present project is to build and enlarge the levees to a certain section sufficient to protect the basin against overflow. This project was adopted in 1882. It has been modified from time to time, and at present contemplates the enlargement of the existing levee line in cooperation with the local levee boards to a grade 3 feet above the deduced confined flood level, with a section having a crown of 8 feet width, river slope one on three, and a back slope one on three to 8 feet below crown, and thence a banquettes of varying widths from 20 to 40 feet, dependent on the height of the levee.

Operations and results prior to the present year.—Under the present project has consisted in building new levees, enlarging and repairing existing levees, and protecting levees during floods. The work has been successful in protecting the basin against overflow from ordinary floods. Protection against extraordinary floods has not been provided, as the levees have not been completed. The work has progressed on the project a constantly increasing amount of protection has been afforded by the levees. The levee line was closed previous to the information as to conditions in 1882 is lacking. Crevasses have occurred as follows:

.....	4
.....	1
.....	3
.....	1
.....	1

Five of the breaks which occurred in 1884 were promptly closed. The unprotected project has afforded complete protection for 24 out of the past 27 years. The amounts spent for new work and for maintenance prior to the closing of the present fiscal year are \$777,676.54 and \$208,723.87, respectively, a total of \$986,400.41.

Operations and results during the present year.—Construction was continued by contract and by hired labor. The work under construction and the progress made is shown in the following table and has resulted in increased protection against floods:

Name of levee.	Kind of work.	Miles below Cairo.	Length.	Average height.	In contract.
			<i>Fct.</i>	<i>Fct.</i>	<i>Cubic yards.</i>
New.....		897 R.	4,010	15.1	150,721.33
New and enlarging.....		952-6 R.	21,003	17.5	457,000.00
Total.....					607,721.33

Name of levee.	Placed during year.	Paid for during year.	Price per cubic yard.	Cost.	Required to complete.
	<i>Cubic yards.</i>	<i>Cubic yards.</i>	<i>Cents.</i>		<i>Cubic yards.</i>
New.....	150,721.33	150,721.33	10.80	\$16,312.82	360,704
New and enlarging.....	96,296.00	88,850.88	10.23	9,089.45	
Total.....	247,017.33	239,572.21		25,402.27	

¹ Field cost by hired labor.

Machine (Buras)—Location (Salsburg):

Mobilization.....	\$1,237.01
Clearing.....	180.00
Plowing.....	142.50
Operation.....	10,179.80
Repairs.....	4,282.06
Dressing.....	206.28
Sodding.....	62.52
Surveys.....	21.75
Depreciation.....	2,750.64
Overhead.....	288.12
Total cost.....	19,351.58

Handled.....	yards.....	150,721.33
Cost per yard.....	cents.....	12.84

3636 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Work was done by hired labor. Work on the various levees was commenced and finished as follows:

Name of levee.	Miles below Calro.	Work commenced.	Work finished.	Remarks.
Salsburg.....	897 R.	Aug. 20, 1916	Nov. 20, 1916	
Willswood.....	952-6 R.	Dec. 21, 1916		In course of construction.

The total work done by the United States and local authorities is as follows:

Constructed by the United States.....	cubic yards.....	247,017
Constructed by local authorities.....	do.....	884,482

Total constructed during the year.....	do.....	1,131,499
Percentage of work done by the United States.....		21.83

The effect has been to give increased security against floods. The completed levee line is 10.21 miles in length.

Condition at end of present year.—The following is the condition of the levees at the end of the present year (May 31, 1917):

Project for earthwork.....	per cent completed.....	70.4
Miles in system.....		82.14
Miles built.....		82.14
Yardage lost during the year.....	cubic yards.....	517,071
Contents of levee (May 31, 1917).....	do.....	12,634,839
Required to bring levees to grade and section.....	do.....	4,628,217
Required to bring levees to grade and section and to construct new levees, which will become necessary within the next five years.....	cubic yards.....	5,311,096
Miles of levees above highest water:		
Less than 1 foot.....		2.41
From 1 to 2 feet.....		14.21
From 2 to 3 feet.....		26.85
From 3 to 4 feet.....		17.51
From 4 to 5 feet.....		None.
Miles of levees up to full grade but deficient in section.....		10.91
Miles of levees up to full grade and section.....		10.21

Levees built by local authorities contain earth not applying toward completion of project and require additional earth to be made of specified dimensions.

Local cooperation.—Local authorities have expended in part and between 1882 and January 1, 1917, \$5,835,312.49 in building, improving, and maintaining levee lines. Other expenditures since 1882, and heavy ones previous thereto, are known to have been made, but no accurate record of them has been discovered.

Proposed operations.—The project is 29.6 per cent uncompleted. The work proposed for the next year consists of completing the work now in progress and extending this line as far downstream as available funds will permit. The object of this work is to secure the levee line at its head.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1917, exclusive of receipts from sales etc., formerly included:

New work.....	\$923,892.37
Maintenance.....	101,803.22
Total expended.....	1,025,695.59
Total appropriations to June 30, 1917.....	1,105,551.06

¹Recent levels made in change in last year's estimate.

Fiscal year ending June 30.	1913	1914	1915	1916	1917
Expended for new work.....	\$72,860.66	\$119,931.38	\$77,715.78	\$22,507.55	\$35,673.99
Expended for maintenance.....	2,797.03	1,009.07	.....	13,565.69	.....
Total expended.....	75,657.69	120,940.45	77,715.78	36,073.24	35,673.99
Appropriated or allotted.....	75,000.00	100,000.00	25,000.00	100,000.00	.....

July 1, 1916, balance unexpended..... \$15,529.46
Amount appropriated by river and harbor act approved July 27, 1916..... 100,000.00

115,529.46

June 30, 1917, amount expended during fiscal year, exclusive of receipts from sales, for new work..... 35,673.99

July 1, 1917, balance unexpended..... 79,855.47

July 1, 1917, outstanding liabilities..... \$4,568.86

July 1, 1917, amount covered by uncompleted contracts..... 47,427.96

51,996.82

July 1, 1917, balance available for fiscal year ending June 30, 1918..... 27,858.65

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
"PROTECTION OF LEVEES, RIGHT BANK BELOW RED RIVER."		
Sept. 19, 1890 (river and harbor).....	.....	\$6,222.30
"PROTECTION OF LEVEES, FOURTH DISTRICT."		
Aug. 11, 1898 (river and harbor).....	.....	32,536.62
"LAFOURCHE LEVEE DISTRICT."		
July 13, 1892 (river and harbor).....	Aug. 10, 1892	90,000.00
Mar. 3, 1893 (sundry civil).....	May 18, 1893	90,000.00
Aug. 18, 1894 (sundry civil).....	.....	90,000.00
Mar. 2, 1895 (sundry civil).....	.....	188,200.00
June 3, 1896 (river and harbor).....	June —, 1896	8,437.50
June 4, 1897 (sundry civil).....	Aug. 20, 1897	41,600.00
July 19, 1897 (deficiency).....	July 19, 1897	8,437.50
July 1, 1898 (sundry civil).....	Mar. 10, 1898	24,000.00
Do.....	June 29, 1898	12,000.00
Mar. 3, 1899 (sundry civil).....	Mar. 13, 1899	37,050.00
June 6, 1900 (sundry civil).....	July 20, 1900	28,000.00
June 13, 1912 (river and harbor).....	July 12, 1902	20,000.00
Mar. 3, 1903 (sundry civil).....	Nov. 25, 1903	20,000.00
Apr. 28, 1904 (sundry civil).....	July 21, 1903	40,000.00
Mar. 3, 1905 (river and harbor).....	Apr. 26, 1905	15,000.00
Mar. 3, 1905 (sundry civil).....	July 25, 1905	21,067.14
June 25, 1910 (river and harbor).....	July 6, 1910	13,000.00
July 25, 1912 (river and harbor).....	Aug. 3, 1912	120,000.00
Mar. 4, 1913 (river and harbor).....	Apr. 30, 1913	60,000.00
Do.....	(3)	15,000.00
Oct. 2, 1914 (river and harbor).....	Oct. 15, 1914	100,000.00
Mar. 4, 1915 (river and harbor).....	Apr. 18, 1915	25,000.00
July 27, 1916 (river and harbor).....	Aug. 14, 1916	100,000.00
Grand total.....	.....	1,066,792.14
.....	.....	1,105,551.06

¹ Original allotment, \$90,000: \$1,800 transferred to Homochitto levee district.

² Original allotment, \$40,000: \$18,932.86 transferred to Lower Tensas levee district.

³ By transfer.

⁴ Original allotment, \$50,000: \$10,000 transferred to harbors at Natchez and Vidalia, Miss. and La., \$5,000 transferred to Lower Tensas levee district; \$10,000 transferred to Barataria levee district.

Effect of improvement.—The effect of the work has been to give added protection against floods. The work can not be allowed to remain without further cooperation. Complete protection is not yet afforded and any delay may cause serious damage.

Contracts in force.

Name of contractor.	Amount of work (yards).	Character of work.	Unit price (cents).	Date of approval.
O. O. Ogden.....	457,000	New and enlargement.	10.23	Dec. 13, 1916

Name of contractor.	Date of beginning.	Date of expiration.	Per cent complete.	Name of levee.	Miles below Cairo.
O. O. Ogden.....	Dec. 21, 1916	Jan. 31, 1917	21.1	Willwood.....	952-6 R.

(d) *Barataria levee district.*

Location.—The Barataria levee district extends on the right bank from the lower limits of New Orleans, 981.5 miles below Cairo, to the Head of the Passes, 1,064 miles below Cairo, with a river frontage of 82.5 miles. The levee line is continuous to the Jump, 71.12 miles. The total area protected in this and the Lafourche district is 2,020 square miles.

Original condition.—Originally there were no levees and the country was subject to overflow. The first levees were built by riparian owners under a Spanish law which required each riparian owner to build a levee. Gradually the work was taken over by the State authorities. The flood of 1882 caused many crevasses and practically destroyed the old levee line.

Previous projects.—None.

Present project.—The present project is to build and enlarge the levees to a grade and section sufficient to protect the basin against overflow. This project was adopted in 1882. It has been modified from time to time and at present contemplates the enlargement of the existing levee line in cooperation with the State and local levee boards to a grade 3 feet above the deduced confined flood of 1912, with a section having a crown of 8 feet width, river slope 1 on 3, land slope 1 on 3 to 8 feet below crown, and thence a banquette of varying widths from 20 to 40 feet, dependent on the height of the levee.

Operations and results prior to the fiscal year.—Under the present project work has consisted in building new levees, enlarging and repairing existing levees, and protecting levees during floods. The work has been successful in protecting the basin against overflow from ordinary floods. Protection against extreme floods has not been provided, as the levees have not been completed. As work has progressed on the project, a constantly increasing amount of protection has been afforded by the levees. The following crevasses have occurred:

1882.....	3
1884.....	1
1890.....	8
1892.....	3
1898.....	2
1897.....	1
1903.....	3
1907.....	1
1912.....	1

The break which occurred in 1912 was promptly closed before serious damage had occurred. The amounts spent for new work and for maintenance prior to the beginning of the fiscal year are \$650,866.22 and \$112,290.70, respectively, a total of \$763,156.92.

Operations and results during the present year.—Construction was continued by hired labor, adding 137,511 cubic yards to the levee line as shown in the following table:

Name of levee.	Kind of work.	Miles below Calro.	Length.	Average height.	In con- tract.
			<i>Feet.</i>	<i>Feet.</i>	<i>Cubic yards.</i>
Myrtle Grove.....	New.....	1,005 R.	3,215	11.8	65,103.00
Magnolia to Socola.....	Enlargement.....	1,018 R.	5,000	9.1	37,349.36
Lower Riceland.....	New and enlargement.....	1,019 R.	3,490	12.2	44,349.23
Rhodey to Reddick.....	do.....	1,038-41 R.	19,916	9.0	95,462.75
Total.....					242,264

Name of levee.	Placed during year.	Paid for during year.	Price per cubic yard.	Cost.	Required to complete.
	<i>Cubic yards.</i>	<i>Cubic yards.</i>	<i>Cents.</i>		<i>Cubic yards.</i>
Myrtle grove.....	1,200.00	1,200.00	14.82	\$177.84	
Magnolia to Socola.....	8,182.22	8,182.22	12.49	1,021.84	
Lower Riceland.....	42,349.23	42,349.23	16.00	6,777.39	2,000.00
Rhodey to Reddick.....	85,779.69	85,779.69	14.48	12,425.18	9,683.06
Total.....	137,511.14	137,511.14		20,402.25	

¹ Field cost by hired labor.

At Star (996-8-R.) 2,474.26 square yards of concrete revetment were placed at a cost of \$4,392.43.

The following repairs were made by hired labor:

At Star (996-8-R.) 8,200 linear feet of wooden revetment at a cost of \$238.50.

At Myrtle Grove (1005-R.) 1,333.33 square yards of concrete revetment at a cost of \$2,319.72.

At Myrtle Grove (1005-R.) 4,000 linear feet of wooden revetment at a cost of \$741.93.

At Lower Riceland (1004-R.) 1,208.60 square yards of concrete revetment at a cost of \$2,492.80.

At Lower Riceland (1004-R.) 7,960 linear feet of wooden revetment at a cost of \$741.93.

Machine and location.	Mobilization.	Clearing.	Drainage.	Plowing.	Operation.	Repairs.	Dressing.
Barataria:							
Myrtle Grove.....	\$30.63				\$87.21		\$8.00
Magnolia to Socola.....	186.80				835.04		(1)
Lower Riceland.....	1,048.00	\$116.16	\$8.40	\$39.75	4,479.95	\$452.66	592.07
Rhodey to Reddick.....	964.50	1,045.10	42.00	63.00	8,068.81	864.00	1,205.26

Machine and location.	Sodding.	Surveys.	Depreciation.	Overhead.	Total cost.	Handled.	Cost per yard.
						<i>Yards.</i>	<i>Cents.</i>
Barataria:							
Myrtle Grove.....	\$2.00		\$46.92	\$24.10	\$248.86	1,200.00	20.74
Magnolia to Socola.....			130.70	168.94	1,321.48	8,182.22	16.15
Lower Riceland.....	32.00	\$8.40	1,091.31	857.90	8,726.60	42,349.23	20.61
Rhodey to Reddick.....	88.00	94.61	2,524.70	1,829.84	17,779.72	85,779.69	20.72

¹ Not yet dressed.

3640 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Work was done by contract and hired labor. Work on the various levees was commenced and finished as follows:

Name of levee.	Miles below Cairo.	Work commenced.	Work finished.
Myrtle Grove.....	1,005 R.	Nov. 8, 1915	June 14, 1916
Magnolia to Socola.....	1,018 R.	July 21, 1915	June 6, 1916
Lower Riceland.....	1,019 R.	Dec. 12, 1916	Under construction.
Rhoday to Reddick.....	1,038-41 R.	Jan. 19, 1917	Do.

The total work done by the United States and local authorities is as follows:

Constructed by the United States.....	cubic yards.....	137,511
Constructed by local authorities.....	do.....	189,281

Total constructed during the year.....	do.....	326,792
Percentage of work done by the United States.....		42.08

The result of the work has been to give increased security against floods. The completed line is 30.50 miles in length.

Conditions at end of present year.—The following is the condition of the levees at the end of the present year (May 31, 1917):

Project for earthwork.....	per cent completed.....	81.1
Miles in system.....		71.12
Miles built.....		71.12
Yardage lost during year by abandoning old levees.....	cubic yards.....	74,015
Contents of levees, May 31, 1917.....	do.....	4,792,433
Required to bring levees to grade and section.....	do.....	968,265
Required to bring levees to grade and section and to construct new levees, which will become necessary within the next five years.....	cubic yards.....	1,222,265
Miles of levees above highest water:		
Less than 1 foot.....		2.24
From 1 to 2 feet.....		9.71
From 2 to 3 feet.....		19.93
From 3 to 4 feet.....		6.77
Miles of levees up to grade but deficient in section.....		2.97
Miles of levees up to grade and section.....		30.50

Local cooperation.—Local authorities have expended, in part and between 1882 and January 1, 1917, \$720,253.53 in building, improving, and maintaining the levee line. Other expenditures since 1882, and heavy ones previous thereto, are known to have been made, but no accurate record of them has been discovered.

Proposed operations.—The project is 18.9 per cent uncompleted. The work proposed for the next year consists of completing the work now in progress and in extending the completed line, as nearly as practicable, continuously downstream. The object of this work is protection for the head of the line and to extend the protection as far as possible.

Effect of improvement.—The effect of the work has been to give added protection again floods. The work can not be allowed to remain without further operations. Complete protection is not yet afforded and any delay may cause serious damage.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1917, exclusive of receipts from sales, etc., formerly included:

New work.....	\$725,248.05
Maintenance.....	111,331.27
Total expended.....	836,579.32
Total appropriations to June 30, 1917.....	904,722.87

Fiscal year ending June 30.	1913	1914	1915	1916	1917
Expended for new work.....	\$21,721.96	\$80,832.42	\$63,210.15	\$62,626.41	\$42,458.58
Expended for maintenance.....	24,481.22	6,580.25	1,572.49	10,536.69	.....
Total expended.....	46,203.18	87,412.67	64,782.64	73,163.10	42,458.58
Appropriated or allotted.....	72,000.00	75,000.00	60,000.00	95,000.00	.....

July 1, 1916, balance unexpended..... \$15,602.13
Amount appropriated by river and harbor act approved July 27,
1916..... 95,000.00

110,602.13

June 30, 1917, amount expended during fiscal year, exclusive of re-
ceipts from sales, for new work..... 42,458.58

July 1, 1917, balance unexpended..... 68,143.55

July 1, 1917, outstanding liabilities..... 528.99

July 1, 1917, balance available for fiscal year ending June 30, 1918 - 67,614.56

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
PROTECTION OF LEVEES—FOURTH DISTRICT.		
Aug. 11, 1888 (river and harbor).....		\$2,947.87
BARATARIA LEVEE DISTRICT.		
July 13, 1892 (river and harbor).....	Aug. 10, 1892	60,000.00
Mar. 3, 1893 (sundry civil).....	May 18, 1893	60,000.00
Aug. 18, 1894 (sundry civil).....		60,000.00
Mar. 3, 1895 (sundry civil).....		158,800.00
June 3, 1896 (river and harbor).....	July 19, 1897	3,937.50
June 4, 1897 (sundry civil).....	Aug. 20, 1897	19,400.00
July 19, 1897 (deficiency).....	July 19, 1897	3,937.50
July 1, 1898 (sundry civil).....	Mar. 10, 1898	15,000.00
Do.....	June 29, 1898	12,000.00
Mar. 3, 1899 (sundry civil).....	Mar. 13, 1899	24,700.00
June 6, 1900 (sundry civil).....	July 20, 1900	14,000.00
June 13, 1902 (river and harbor).....	July 12, 1902	10,000.00
Mar. 3, 1903 (sundry civil).....	Nov. 25, 1903	10,000.00
Apr. 28, 1904 (sundry civil).....	June 25, 1903	15,000.00
Mar. 3, 1905 (sundry civil).....	Apr. 28, 1905	15,000.00
Mar. 3, 1905 (river and harbor).....	July 29, 1905	15,000.00
June 30, 1906 (sundry civil).....	June 28, 1906	10,000.00
Mar. 2, 1907 (river and harbor).....	Mar. 27, 1907	25,000.00
May 27, 1908 (sundry civil).....	May 4, 1908	40,000.00
June 25, 1910 (sundry civil).....	Apr. 30, 1910	25,000.00
June 25, 1910 (river and harbor).....	(¹)	2,500.00
June 25, 1910 (sundry civil).....	(²)	7,500.00
Do.....	(²)	1,000.00
Feb. 27, 1911 (river and harbor).....	July 8, 1911	12,000.00
July 25, 1912 (river and harbor).....	Aug. 3, 1912	80,000.00
Mar. 4, 1913 (river and harbor).....	Apr. 30, 1913	50,000.00
Do.....	(²)	12,000.00
Do.....	(²)	10,000.00
Oct. 2, 1914 (river and harbor).....	Oct. 15, 1914	75,000.00
Mar. 4, 1915 (river and harbor).....	Apr. 18, 1915	60,000.00
July 27, 1916 (river and harbor).....	Aug. 14, 1916	95,000.00
Total.....		904,722.87

¹ Original allotment, \$60,000; \$1,200 transferred to Homochitto levee district.

² By transfer.

Contracts in force.—None.

(e) Homochitto levee district.

Location.—The Homochitto levee district extends on the left bank, in continuation of the Lower Yazoo district, from the mouth of the Yazoo River, 559 miles below Cairo, to Baton Rouge, 834 miles below Cairo, with a river frontage

of 234 miles and an area of 233 square miles. There is no continuous levee line; several disconnected short levees exist, and loops are built at Rodney to Coles Creek, 639 to 666 miles below Cairo; Palmetto Point, 745 to 752 miles below Cairo; Angola State farm, 764 to 770 miles below Cairo; and Bayou Sara, 800 miles below Cairo. The total length of these levees is 39.77 miles.

Original condition.—Originally there were no levees and the country was subject to overflow. The levees were all built by property owners previous to 1912.

Previous project.—No project for work by the United States existed previous to 1912. In 1912 and 1913 the project adopted by the Mississippi River Commission was to rebuild levees damaged by the flood of 1912. This project was completed in 1912.

Present project.—None.

Operations and results prior to the present year.—Under the project of 1912 and 1913, \$23,402.56 was expended in rebuilding broken levees between Vicksburg, Miss., and Bayou Sara, La. The effect of this work was to restore the levees to the condition in which they were previous to the flood of 1912.

Operations and results during the present year.—None.

Condition at end of present year.—With the exception of the 13.1 miles of levee around Angola State farm, all levees are below grade and deficient in section. A detailed survey has not been made. In case of an extreme flood, the levee line would probably be broken at many places.

Local cooperation.—The levees have been built and maintained by the property owners. No record of their cost is available.

Effect of improvement.—The effect of the improvement already made is to give as large a measure of protection as the value of the lands behind the levees will justify.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1917, exclusive of receipts from sales, etc., formerly included:

New work.....	\$2, 501. 22
Maintenance	5. 07
Total expended.....	2, 506. 29
Total appropriations to June 30, 1917.....	3, 000. 00

Fiscal year ending June 30.		1910.	1912.
Expended for new work.....		\$2, 501. 22	.....
Expended for maintenance.....			\$5. 07
Total expended.....		2, 501. 22	5. 07
Appropriated or allotted.....		3, 000. 00	

July 1, 1916, balance unexpended.....	\$493. 71
Balance available for fiscal year ending June 30, 1918.....	493. 71

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
June 25, 1910 (river and harbor).....	July 6, 1910	\$3, 000. 00

Contracts in force.—None.

(f) Pontchartrain levee district.

Location.—The Pontchartrain levee district extends on the left bank from the lower limits of Baton Rouge, 834 miles below Cairo, to New Orleans, 957.5 miles below Cairo, with a river frontage of 123.5 miles. The levee line is continuous, and is 125.33 miles in length. The Pontchartrain and Lake Borgne levee districts comprise the same basin, which has a total area of 1,816 square miles.

Original condition.—Originally there were no levees, and the country was subject to overflow. The first levees were built by riparian owners, under a Spanish law, which required each riparian owner to build a levee. Gradually the work was taken over by the State authorities. The flood of 1882 caused many crevasses and practically destroyed the old levee line.

Previous projects.—None.

Present project.—The present project is to build and enlarge the levees to a grade and section sufficient to protect the basin against overflow. This project was adopted in 1882. It has been modified from time to time, and at present contemplates the enlargement of the existing levee line in cooperation with the State and local levee boards to a grade 3 feet above the deduced confined flood of 1912, with a section having a crown of 8 feet width, river slope one on three, land slope one on three to 8 feet below crown, and thence a banquet of varying widths, from 20 to 40 feet, dependent on the height of the levee.

Operation and results prior to the fiscal year.—Under the present project work has consisted in building new levees, enlarging and repairing existing levees, and protecting levees during floods. The work has been successful in protecting the basin against overflow from ordinary floods. Protection against extreme floods has not been provided, as the levees have not been completed. As work has progressed on the project, a constantly increasing amount of protection has been afforded by the levees. The gaps in the levee line were closed by the State in 1882. Since then crevasses have occurred, as follows:

1882	2
1884	2
1890	2
1892	5
1893	4
1897	1

Of the four breaks which occurred in 1893, three were promptly closed. The uncompleted work has afforded continuous protection for the past 20 years, during which time two of the greatest floods known have been successfully passed. The amounts spent for new work and for maintenance prior to the beginning of the fiscal year are \$1,988,226.87 and \$180,051.16, respectively, a total of \$2,168,278.03.

Operation and results during the present year.—Construction was continued by contract and hired labor. The work done has finished 7.56 miles of levee, giving increased protection against floods and has been as shown in the following table:

Name of levee.	Character of work.	Miles below Cairo.	Length.	Average height.	In contract.
			<i>Feet.</i>	<i>Feet.</i>	<i>Cubic yards.</i>
Arlington	Enlargement	837 L.	5,639	21.8	153,242.40
Shannon	New	838 L.	2,753	20.5	182,713.59
Ben Hur	Enlargement	845 L.	8,300	19.5	230,047.87
Ben Hur to Burtville	New and enlargement	845-7 L.	12,079	18.1	375,000.00
Towles	do	850-3 L.	12,940	18.0	408,164.66
Southwood	Enlargement	876 L.	3,572	17.3	56,160.00
Total					1,495,318.52

Name of levee.	Placed during year.	Paid for during year.	Price per cubic yard.	Cost.	Required to complete.
	<i>Cubic yards.</i>	<i>Cubic yards.</i>	<i>Cents.</i>		<i>Cubic yards.</i>
Arlington	68,532.50	95,680.04	13.00	\$12,438.40	
Shannon	182,713.59	182,713.59	13.27	24,252.24	2,810.00
Ben Hur	143,900.00	143,000.00	8.39	12,073.21	
Ben Hur to Burtville	9,928.00	9,928.00	6.13	609.00	365,072.00
Towles			12.70		408,164.66
Southwood	56,150.00	56,150.00	14.42	8,096.88	
Total	461,224.09	488,371.63		57,469.73	778,046.66

¹ Field cost by hired labor.

Machine and location.	Mobillization.	Clearing.	Plowing.	Operation.	Repairs.	Dressing.	Sodding.
Beauregard, Shannon.....	\$5,893.52	\$108.00	\$243.00	\$11,890.99	\$4,529.28	\$1,492.95	\$94.50
Buras:							
Ben Hur.....	1,068.09	15.00	330.00	14,427.61	1,442.19	1,907.60	132.00
Ben Hur to Burtville.....			30.00	424.00	100.00	45.00	10.00
Buras and Beauregard, Southwood.....	1,410.86		142.50	4,881.39	1,144.13	464.50	53.50

Machine and location.	Surveys.	Depreciation.	Overhead.	Total cost.	Yards handled.	Cost per yard.
Beauregard, Shannon.....	\$17.50	\$5,254.44	\$3,288.83	\$32,813.01	182,713.59	<i>Cents.</i> 17.96
Buras:						
Ben Hur.....	12.00	3,681.81	2,590.20	25,606.50	143,900.00	17.76
Ben Hur to Burtville.....	2.50	125.60	178.71	915.81	9,928.00	9.22
Buras and Beauregard, Southwood.....	16.00	4,454.19	1,010.70	13,577.77	56,150.00	24.18

Work was done by contract and by hired labor. Work on the various levees was commenced and finished as follows:

Name of levee.	Miles below Cairo.	Work commenced.	Work finished.
Arlington.....	837 L.	May 4, 1915	Dec. 7, 1916
Shannon.....	838 L.	Nov. 15, 1916	Mar. 8, 1917
Ben Hur.....	845 L.	Sept. 9, 1915	Mar. 15, 1917
Ben Hur to Burtville.....	845-7 L.	Mar. 16, 1917	Under construction.
Towles.....	850-3 L.		Not commenced.
Southwood.....	876 L.	Apr. 14, 1917	May 25, 1917

The total work done by the United States and local authorities is as follows:

Constructed by the United States.....	cubic yards.....	461,224
Constructed by local authorities.....	do.....	¹ 443,361

Total constructed during the year.....	do.....	904,585
Percentage of work done by the United States.....		51

The result of the work has been to give increased protection against floods. The completed levee line is 7.56 miles in length.

Condition at end of present year.—The following is the condition of the levees at the end of the present year (May 31, 1917):

Project for earthwork.....	per cent completed.....	(9)
Miles in system.....		125.33
Miles built.....		125.33
Yardage lost during the year.....	cubic yards.....	167,785
Contents of levees (May 31, 1916).....	do.....	² 22,425,506
Required to bring levees to grade and section.....	do.....	² 9,743,658
Required to bring levees to grade and section and to construct new levees, which will become necessary within the next five years.....	cubic yards.....	10,560,000
Miles of levee above highest water:		
Less than 1 foot.....		None.
From 1 to 2 feet.....		16.27
From 2 to 3 feet.....		61.87
From 3 to 4 feet.....		20.30
From 4 to 5 feet.....		None.
Miles of levee up to full grade, but deficient in section.....		19.24
Miles of levee up to full grade and section.....		7.56

¹ Does not include 68,700 cubic yards placed in the new Sarpy levee, as the old levee is still the controlling levee line.

² Does not include 408,164 cubic yards under contract.

Local cooperation.—Local authorities have expended, in part and between 1882 and January 1, 1917, \$4,476,571.58 in building, improving, and maintaining the levee line. Other expenditures since 1882, and heavy ones previous thereto, are known to have been made, but no accurate record of them has been discovered.

Proposed operations.—The project is 31 per cent uncompleted. The work proposed for the next year consists of completing the work now in progress and extending this work as far downstream as funds will permit. The object of this work is to secure the head of the district.

Effect of improvement.—The effect of the work has been to give added protection against floods. The work can not be allowed to remain without further operations. Complete protection is not yet afforded and any delay may cause serious damage.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1917, exclusive of receipts from sales, etc., formerly included:

New work	\$2,061,996.24
Maintenance	171,010.56
Total expended	2,232,006.80
Total appropriations to June 30, 1917	2,329,129.61

Fiscal year ending June 30.	1913	1914	1915	1916	1917
Expended for new work	\$49,841.51	\$102,384.34	\$54,677.25	\$38,815.07	
Expended for maintenance	39,703.18	616.33		14,461.00	\$87,272.88
Total expended	89,544.69	103,000.67	54,677.25	53,276.07	87,272.88
Appropriated or allotted	90,000.00	100,000.00	45,000.00	125,000.00	

July 1, 1916, balance unexpended	\$58,395.69
Amount appropriated by river and harbor act approved July 27, 1916	125,000.00
	183,395.69

June 30, 1917, amount expended during fiscal year, exclusive of receipts from sales, for new work	87,272.88
---	-----------

July 1, 1917, balance unexpended	96,122.81
July 1, 1917, outstanding liabilities	\$3,708.13
July 1, 1917, amount covered by uncompleted contracts	60,821.00
	64,529.13
July 1, 1917, balance available for fiscal year ending June 30, 1918	31,593.78

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
"RONNET CARRE CREVASSE."		
Aug. 2, 1882 (river and harbor)		\$15,000.00
"LEVEES, LEFT BANK BELOW RED RIVER."		
Sept. 19, 1890 (river and harbor)	Dec. 4, 1890	89,775.00
Do.		21,850.00
Do.		6,750.70
Do.		780.90
		119,156.60
"PROTECTION OF LEVEES, LEFT BANK BELOW RED RIVER."		
Sept. 19, 1890 (river and harbor)		6,563.00
Do.	(1)	355.30
Do.	(1)	41.10
Do.	(1)	3,000.00
		9,959.40

¹ By transfer.

Abstract of appropriations—Continued.

Act of Congress.	Allotted.	Amount.
"PROTECTION OF LEVEES, FOURTH DISTRICT."		
Aug. 11, 1888 (river and harbor).....		\$15,630.57
"PONTCHARTRAIN LEVEE DISTRICT."		
July 13, 1892 (river and harbor).....	Aug. 10, 1892	150,000.00
Mar. 3, 1893 (sundry civil).....	May 18, 1893	150,000.00
Aug. 18, 1894 (sundry civil).....		150,000.00
Do.....	(1)	4,633.04
Mar. 2, 1895 (sundry civil).....		* 147,000.00
June 3, 1896 (river and harbor).....	June .. 1896	22,500.00
June 4, 1897 (sundry civil).....	Aug. 20, 1897	113,150.00
July 19, 1897 (deficiency).....	July 19, 1897	22,500.00
July 1, 1898 (sundry civil).....	Mar. 10, 1898	60,000.00
Do.....	June 29, 1899	16,000.00
Mar. 3, 1899 (sundry civil).....	Mar. 13, 1899	74,100.00
June 6, 1900 (sundry civil).....	July 20, 1900	50,000.00
June 13, 1902 (river and harbor).....	July 12, 1902	101,500.00
Mar. 3, 1903 (sundry civil).....	Nov. 25, 1903	81,500.00
Apr. 28, 1904 (sundry civil).....	June 25, 1903	90,000.00
Mar. 3, 1905 (sundry civil).....	Apr. 26, 1905	90,000.00
Mar. 3, 1905 (river and harbor).....	July 29, 1905	80,000.00
June 30, 1906 (sundry civil).....	June 28, 1906	35,000.00
Mar. 2, 1907 (river and harbor).....	Mar. 27, 1907	120,000.00
May 27, 1908 (sundry civil).....	May 4, 1908	75,000.00
Mar. 4, 1909 (sundry civil).....	Apr. 28, 1909	40,000.00
June 25, 1910 (sundry civil).....	Apr. 30, 1910	27,000.00
June 25, 1910 (river and harbor).....	July 6, 1910	* 2,500.00
July 25, 1912 (river and harbor).....	Aug. 3, 1912	127,000.00
Mar. 4, 1913 (river and harbor).....	Apr. 30, 1913	90,000.00
Oct. 2, 1914 (river and harbor).....	Oct. 15, 1914	100,000.00
Mar. 4, 1915 (river and harbor).....	Apr. 18, 1915	* 45,000.00
July 27, 1916 (river and harbor).....	Aug. 11, 1916	125,000.00
		2,199,383.04
Grand total.....		2,329,129.61

¹ By transfer.² Original allotment, \$150,000; \$3,000 transferred to Atchafalaya levee district.³ Original allotment, \$23,000; \$8,500 transferred to Barataria levee district, and \$12,000 transferred to Lower Tensas levee district.⁴ Original allotment, \$50,000; \$5,000 transferred to harbors at Natchez and Vidalia, Miss. and La.*Contracts in force.*

Name of contractor.	Amount of work.	Character of work	Unit price.	Date of approval	Date of beginning work.	Date of expiration.	Name of levee.	Miles below Cairo.
Don B. Hearin & Son.	408,164.66	New and enlargement.	Cents. 12.70	1916. Dec. 13	1916. Oct. 30	1918. Jan. 31	Towles..	850-3 L.

(g) Lake Borgne levee district.

Location.—The Lake Borgne levee district extends on the left bank from the lower limits of New Orleans, 973 miles below Cairo, to the Head of the Passes, 1,064 miles below Cairo, with a river frontage of 91 miles. The levee line is continuous to a point about 14 miles above the Head of the Passes, a length of 79.29 miles. The Lake Borgne and Pontchartrain levee districts comprise the same basin, which has a total area of 1,816 square miles.

Original condition.—Originally, there were no levees and the country was subject to overflow. The first levees were built by riparian owners under a Spanish law which required each riparian owner to build a levee. Gradually the work was taken over by the State authorities. The flood of 1882 caused many crevasses and practically destroyed the old levee line.

Previous projects.—None.

present project.—The present project is to build and enlarge the levees to a grade and section sufficient to protect the basin against overflow. This project was adopted in 1882. It has been modified from time to time and at present contemplates the enlargement of the existing levee line in cooperation with the local levee boards to a grade 3 feet above the deduced confined water of 1912, with a section having a crown of 8 feet width, river slope one on one, and land slope one on three to 8 feet below crown, and thence a banquettes varying widths from 20 to 40 feet, dependent on the height of the levee.

Operations and results prior to the fiscal year.—Under the present project the work has consisted in building new levees, enlarging and repairing existing levees, and protecting levees during floods. The work has been successful in protecting the basin against overflow from ordinary floods. Protection against extreme floods has not been provided, as the levees have not been completed. The work has progressed on the project, a constantly increasing amount of protection has been afforded by the levees. The exact date when the levee line is closed is not known. Crevasses have occurred as follows:

.....	29
.....	24
.....	22
.....	3
.....	6
.....	4
.....	1

The six breaks which occurred in 1903 were all promptly closed before serious damage had been done. The four breaks in 1907 were minor. The one break in 1912 was immediately closed. During the storm of September 29, 1915, 23 breaks occurred in the levee line. All of these breaks have since been closed. As noted above, the uncompleted levee system has protected the basin from floods. The amounts spent for new work and maintenance prior to the beginning of the present fiscal year are \$563,425.62 and \$109,158.52, respectively, a total of \$672,584.14.

Operations and results during the present year.—Construction was continued by contract and by hired labor. The work under construction and the progress thereon is shown in the following table and has increased protection against floods.

Name of levee.	Kind of work.	Miles below Cairo.	Length.	Average height.	In contract.
			<i>Feet.</i>	<i>Feet.</i>	<i>Cu. yards.</i>
.....	New and enlargement.	999 L.	5,263	12.0	51,952.49
.....	do	1,000-02 L.	11,316	8.3	49,294.00
.....	do	1,015 L.	6,435	8.5	19,713.26
.....	do	1,041-2 L.	5,383	5.8	20,000.00
Total					170,959.75

Name of levee.	Placed during year.	Paid for during year.	Price per cubic yard.	Cost.	Required to complete.
	<i>Cu. yards.</i>	<i>Cu. yards.</i>	<i>Cents.</i>		<i>Cu. yards.</i>
.....	51,952.49	51,952.49	13.64	\$7,088.72	
.....	33,069.00	33,069.00	13.49	4,459.89	16,225
.....	5,160.51	5,160.51	16.3	841.16	
.....	11,200.00	11,200.00	11.41	1,278.39	8,800
Total	101,382.00	101,382.00		13,668.16	25,025

¹ Field cost by hired labor.

The following repairs were made by hired labor at Sophie Levee (1,004 L): 1,860 square yards of concrete revetment at a cost of \$2,104.70; 1,000 linear feet of wooden revetment at a cost of \$42.60.

3648 REPORT OF THE CHIEF OF ENGINEERS, U. S. ARMY.

Machine and location.	Mobilization.	Clearing.	Plowing.	Operation.	Repairs.	Dressing.	Sodding.
Barataria:							
Belair.....	\$457.42	\$293.20	\$72.00	\$5,208.61	\$561.20	\$306.10	\$122.00
Burbridge.....	327.00	961.39	12.70	2,119.32	266.81	623.10	88.50
Fort St. Philip.....	280.00	12.20		911.99		68.60	

Machine and location.	Surveys.	Depreciation.	Overhead.	Total cost.	Yards handled.	Cost per yard.
Barataria:						<i>Cents.</i>
Belair.....	\$68.19	\$1,976.25	\$1,194.85	\$10,259.82	51,952.49	19.75
Burbridge.....	31.07	1,368.12	759.30	6,587.31	33,069.00	19.92
Fort St. Philip.....	5.60	339.08	257.60	1,875.07	11,200.00	16.74

Work was done by contract and by hired labor. Work on the various levees was commenced and finished as follows:

Name of levee.	Miles below Cairo.	Work commenced.	Work finished.
Belair.....	999 L.	Oct. 25, 1916	Dec. 11, 1916.
Burbridge.....	1,000-2 L.	June 15, 1916	Under construction.
Pointe-a-la-Hache.....	1,015 L.	Oct. 25, 1915	Dec. 14, 1916.
Fort St. Philip.....	1,041 L.	May 18, 1917	Under construction.

The total work done by the United States and local authorities is as follows:

Constructed by the United States.....cubic yards... 101,382
 Constructed by local authorities.....do..... 167,752

Total constructed during the year.....do..... 269,134

Percentage of work done by the United States..... 37.66

The result of the work has been to give increased protection against floods. The completed levee line is 43.40 miles in length.

Condition at end of present year.—The following is the condition of the levees at the end of the present year (May 31, 1917):

Project for earthwork.....	per cent completed.....	87.6
Miles in system.....		78.29
Miles built.....		78.29
Yardage lost during the year by abandoning old levees.....	cubic yards.....	95,309
Contents of levees (May 31, 1917).....	do.....	5,600,172
Required to bring levees to grade and section.....	do.....	792,584
Required to bring to grade and section and to construct new levees, which will become necessary within the next five years.....	cubic yards.....	1,023,000
Miles of levee above highest water:		
Less than 1 foot.....		0.71
From 1 to 2 feet.....		11.69
From 2 to 3 feet.....		16.47
From 3 to 4 feet.....		2.99
Miles of levee up to full grade but deficient in section.....		3.03
Miles of levee up to full grade and section.....		43.40

Local cooperation.—Local authorities have expended, in part and between 1882 and January 1, 1917, \$1,867,964.58 in building, improving, and maintaining the levee line. Other expenditures since 1882, and heavy ones previous thereto, are known to have been made, but no accurate record of them has been discovered.

Proposed operations.—The project is 12.4 per cent uncompleted. The work proposed for the next year consists of completing the work now in progress and extending the completed levee line as far as funds will permit. The object of this work is to give greater security to the line.

Effect of improvement.—The effect of the work has been to give added protection against floods. The work can not be allowed to remain without further operations. Complete protection is not yet afforded and any delay may cause serious damage.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1917, exclusive of receipts from sales, etc., formerly included:

For new work	\$872,521.00
Maintenance	62,855.14

Total expended	735,376.14
----------------	------------

Total appropriations to June 30, 1917	772,400.00
---------------------------------------	------------

Fiscal year ending June 30.	1913	1914	1915	1916	1917
Expended for new work	\$13,595.59	\$86,591.66	\$45,128.80	\$51,291.74	\$28,338.48
Expended for maintenance	25,036.37	2,468.77		8,030.58	
Total expended	39,631.96	89,060.43	45,128.80	59,322.32	28,338.48
Appropriated or allotted	50,000.00	75,000.00	40,000.00	50,000.00	

July 1, 1916, balance unexpended	\$15,362.34
----------------------------------	-------------

Amount appropriated by river and harbor act approved July 27, 1916	50,000.00
--	-----------

65,362.34

June 30, 1917, amount expended during fiscal year exclusive of receipts from sales for new work	28,338.48
---	-----------

July 1, 1917, balance unexpended	37,023.86
----------------------------------	-----------

July 1, 1917, outstanding liabilities	2,908.89
---------------------------------------	----------

July 1, 1917, balance available for fiscal year ending June 30, 1918	34,114.97
--	-----------

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
July 13, 1892 (river and harbor)	Aug. 10, 1892	\$50,000
Mar. 3, 1893 (sundry civil)	May 18, 1893	50,000
Aug. 18, 1894 (sundry civil)		50,000
Mar. 2, 1895 (sundry civil)		19,000
June 3, 1896 (river and harbor)	June —, 1896	4,500
June 4, 1897 (sundry civil)	Aug. 20, 1897	22,200
July 19, 1897 (deficiency)	July 19, 1897	4,500
July 1, 1898 (sundry civil)	Mar. 10, 1898	16,000
Do.	June 29, 1898	8,000
Mar. 3, 1899 (sundry civil)	Mar. 13, 1899	24,700
June 6, 1900 (sundry civil)	July 20, 1900	14,500
June 13, 1902 (sundry civil)	July 12, 1902	10,000
Do.	Mar. 4, 1903	2,000
Mar. 3, 1903 (sundry civil)	Nov. 25, 1903	10,000
Apr. 28, 1904 (sundry civil)	June 25, 1903	15,000
Mar. 3, 1905 (sundry civil)	Apr. 26, 1905	15,000
Mar. 3, 1905 (river and harbor)	July 29, 1905	15,000
June 30, 1906 (sundry civil)	June 28, 1906	10,000
Mar. 2, 1907 (river and harbor)	Mar. 27, 1907	25,000
May 27, 1908 (sundry civil)	May 1, 1908	40,000
Mar. 4, 1909 (sundry civil)	Apr. 28, 1909	6,000
June 25, 1910 (sundry civil)	Apr. 30, 1910	17,000
June 25, 1910 (river and harbor)	July 6, 1910	6,000
Feb. 27, 1911 (river and harbor)	July 8, 1911	13,000
July 25, 1912 (river and harbor)	Aug. 3, 1912	80,000
Mar. 4, 1913 (river and harbor)	Apr. 30, 1913	50,000
Oct. 2, 1914 (river and harbor)	Oct. 15, 1914	75,000
Mar. 4, 1915 (river and harbor)	Apr. 18, 1915	40,000
July 2, 1916 (river and harbor)	Aug. 14, 1916	50,000
Total		772,400

1 Original allotment, \$50,000; \$1,000 transferred to Homochitto levee district.

III. SURVEYS.

Location.—Surveys are made wherever required throughout the limits of the district.

Original condition.—Lack of surveys made data for studies of the river incomplete.

Previous projects.—None.

Present project.—The project adopted by the Mississippi River Commission in 1884 provides for an annual survey, at the lowest river stage, of each locality where work is in progress. In 1888 the project was amplified to include surveys of caving banks wherever important interests are threatened. Except for New Orleans Harbor, surveys of works are included in the cost of the work and reported therein. Special surveys are made, as ordered, from time to time by the Mississippi River Commission.

Operations and results prior to the present year.—Under the existing project surveys have been made annually. The cost of the work has been \$151,966.

The work has been successful in ascertaining rates of caving in time to prevent serious damage and in providing maps from which studies of the river may be made and future work planned.

Operations and results during the present year.—The usual survey of Gouldsboro Bend and Third District Reach, New Orleans Harbor, has been made. The caving banks in Oak and Newtown Bends were surveyed to ascertain amount of caving and the consequent danger of a cut-off. The expenditures amounted to \$3,073.29.

Condition at end of year.—All required surveys have been made. The constant changing of the banks and bed of the river require that surveys be continued.

Local cooperation.—There is no local cooperation in the making of surveys. The maps and records of the chief State engineer of Louisiana are placed at the disposal of the United States whenever information therefrom is desired.

Proposed operations.—It is proposed to continue work under the present project, making annual surveys of each improvement, and such other surveys as the necessities of the case may require.

Effect of improvement.—The surveys made during past years and the present year furnish valuable data for the study of the river at definite localities and for making plans for improvements at these localities.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1917, exclusive of receipts from sales, etc., formerly included:

New work	\$25,201
Maintenance	130,117
Total expended	155,318
Total appropriations to June 30, 1917	163,137

Fiscal year ending June 30.	1913	1914	1915	1916	1917
Expended for new work		\$148.68	\$744.45	\$741.00	\$5,100
Expended for maintenance	\$3,535.45	3,640.54	4,840.06	666.19	
Total expended	3,535.45	3,789.22	5,584.51	1,407.19	5,100
Appropriated or allotted	5,000.00		8,000.00	5,000.00	

July 1, 1916, balance unexpended \$5,923.
Amount appropriated by river and harbor act approved July 27, 1916. 5,000.

10,923.

June 30, 1917, amount expended during fiscal year, exclusive of receipts from sales, for maintenance 3,106.

July 1, 1917, balance unexpended 7,818.
July 1, 1917, outstanding liabilities 767.

July 1, 1917, balance available for fiscal year ending June 30, 1918. 7,051.

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
"SURVEY, UNLEVEED FRONT, FOURTH DISTRICT."		
Aug. 2, 1882 (river and harbor).....		\$1,000.00
"SURVEY, CUBBITTS GAP AND VICINITY."		
Aug. 2, 1882 (river and harbor).....		137.14
"OBSERVATION AT CARROLLTON, LA."		
Aug. 2, 1882 (river and harbor).....		3,000.00
Mar. 3, 1883 (river and harbor).....		1,500.00
		4,500.00
"DISCHARGE OBSERVATIONS."		
Aug. 11, 1888 (river and harbor).....	Oct. 3, 1888	9,000.00
"GAUGES."		
Aug. 11, 1888 (river and harbor).....	Oct. 3, 1888	2,000.00
"SURVEYS, EXAMINATIONS, AND CONTINGENCIES."		
Aug. 11, 1888 (river and harbor).....	Dec. 20, 1888	1,000.00
Do.....	Mar. 20, 1890	3,000.00
		4,000.00
"SURVEYS, GAUGES, AND OBSERVATIONS."		
Sept. 19, 1890 (river and harbor).....	Dec. 4, 1890	12,000.00
Do.....	(¹)	1,000.00
July 13, 1892 (river and harbor).....	Aug. 10, 1892	12,000.00
Mar. 3, 1893 (sundry civil).....	May 18, 1893	12,000.00
Aug. 13, 1894 (sundry civil).....	Sept. 8, 1894	12,000.00
Mar. 2, 1895 (sundry civil).....	Apr. —, 1895	10,000.00
June 3, 1896 (river and harbor).....	Aug. 25, 1897	500.00
Mar. 3, 1899 (sundry civil).....	Mar. 13, 1899	5,000.00
June 6, 1900 (sundry civil).....	May 27, 1899	5,000.00
Do.....	Nov. 28, 1900	1,000.00
June 13, 1902 (river and harbor).....	July 12, 1902	5,000.00
Mar. 3, 1903 (sundry civil).....	July 21, 1903	6,000.00
Apr. 28, 1904 (sundry civil).....	Apr. 1, 1904	5,000.00
Mar. 3, 1905 (sundry civil).....	Apr. 26, 1905	5,000.00
June 30, 1906 (sundry civil).....	June 28, 1906	5,000.00
Mar. 2, 1907 (river and harbor).....	July 12, 1907	5,000.00
May 27, 1908 (sundry civil).....	May 4, 1908	5,000.00
Mar. 4, 1909 (sundry civil).....	Apr. 28, 1909	5,000.00
June 25, 1910 (sundry civil).....	Apr. 30, 1910	5,000.00
Feb. 27, 1911 (river and harbor).....	May 3, 1911	5,000.00
July 25, 1912 (river and harbor).....	Aug. 3, 1912	5,000.00
Mar. 4, 1913 (river and harbor).....	Apr. 30, 1913	5,000.00
Mar. 4, 1915 (river and harbor).....	Apr. 18, 1915	8,000.00
July 7, 1916 (river and harbor).....	Aug. 14, 1916	5,000.00
Grand total.....		163,137.14

¹ Original allotment, \$300; \$162.86 transferred to New Orleans Harbor.² By transfer.³ By transfer, \$5,000.

IV. PLANT.

(a) Riverment plant.

Location.—At New Orleans, La., and at Natchez, Miss., respectively 965 and 700 miles below Cairo.

Original condition.—None.

Previous projects.—None.

Present project.—Adopted in 1884: provides for the construction of such new plant as may be required from time to time and for the repair, maintenance, and care of the plant on hand.

Operations and results prior to the present year.—A plant consisting of 105 large pieces, comprising towboats, hydraulic graders, derrick boats, quarter boats, and barges, together with a fully equipped creosoting cylinder, with the necessary storage tanks railroad-switch tracks, a small woodworking shop, etc.,

had been acquired. The expenditures for new plant had been \$744,777.07, and for repair, maintenance, and care, \$564,822.30, a total of \$1,309,599.37.

Operations and results during the present year.—At date of the last annual report the floating plant of the district consisted of 105 large pieces, exclusive of docks, lighters, gasoline launches, pontoons, skiffs, etc. During the year 1 standard creosoted barges have been built. Two old barges, No. 16-C and No. 28-C, were condemned. The plant now comprises 117 large pieces.

Construction.—A project for the construction of 18 standard barges and a of floating ways was approved August 21, 1916. At date of this report 14 the barges have been completed by hired labor at the engineer depot, at material for the remaining 4 is on hand. In addition to the above plant for this district, 2 levee machines, the *Bourbon* and *Bonaparte*, and 1 steel barge for the third Mississippi River district were assembled and erected by hired labor.

Creosoting plant.—Operation of the creosoting plant for the year shows the following totals: Lumber treated, 1,043,000 feet b. m.; pounds of oil used, 1,159,200; value of creosote used, \$14,982.66. The plant was operated for 14 days, during which time 75 barges were treated.

Government switch.—During the year 172 cars have been received, comprising 93 of lumber, 16 of creosote oil, 13 of coal, 6 of wire nails, 1 of rope, 2 of machinery, 4 of iron, and 37 of earth filling.

Repairs.—The existing plant has been repaired and cared for at the United States engineer depot, New Orleans, La., and at Natchez, Miss., details being as follows:

Designation.	Work done.	Cost.
Newton.....	Renewed: Pittman of propelling engine, castings in furnace and covering on boilers, 6 stanchions on deck. Five ends of boiler tubes and one stay bolt were electrically welded. Main deck was repaired and calked. Canvas on roof and boiler deck was renewed and painted. Stacks were cleaned and painted. Propelling wheel and all screen doors and windows were repaired. Boat inspected August, 1916.	\$3,972
Plaquemine.....	Renewed: Heaters in boilers, all furnace castings brickwork in furnace, foundation for capstan engine. Boiler scaled. Repairs to bell pulls, electric light plant, roof, propelling wheel, cabin and machinery to make good usual wear and tear. All dark trimmings painted. Boat and boiler inspected June, 1916.	1,804
Lafourche.....	Renewed: Lining in jet condenser, fender streak along bow, 6 swinging fenders, 3 stationary fenders, all brickwork and castings in furnace. Boiler scaled. Propelling wheel and screens repaired. Cabin outside cleaned and painted. Kitchen and engine room painted inside. Usual minor repairs to machinery to make good wear and tear. Boat and boiler inspected during May, 1916.	2,138
Tensas.....	Docked; hull cleaned and tarred. Renewed: One stock and both rudders, 1 bumper, all tubes in boiler, 6 stationary fenders, smokestack, and breeching. Hold cleaned under floor in fire room. Wheel repaired. Boat painted throughout. Usual minor repairs to machinery to make good fair wear and tear. Boat and boiler inspected 1916.	2,374
Teche.....	Minor repairs to screens. Boat and boiler inspected May, 1916. Boat painted.	574
Chalmette.....	Docked; hull sandblasted and given coat of coal tar, cement, and headlight oil. All compartments of hull cleaned. Boat painted, rudder bumper rebuilt. Minor repairs to pilot house, master's room, propelling wheel, roof, furnace, and machinery to make good wear and tear. Boat and boiler inspected May, 1916.	1,108
Tickfaw.....	Docked; hull cleaned and tarred. Renewed: Eighty-five feet of angle iron on bulwarks, foundation under capstan, nosing and waterway on roof awnings on stern, covers on skiffs, canvas on roof, stern bushing, propeller wheel. Repairs to fender streak, stay bolts in boiler. Boiler recovered and 43 staybolts renewed and electrically welded. All compartments of hold cleaned. Stern tube refastened. Other minor repairs to machinery to make good usual wear and tear. Boat and boiler inspected June and August, 1916.	5,177
Morganza.....	Docked; hull cleaned and tarred. Renewed: Stern bushing and propeller wheel, 17 rivets in sternpost, 7 rivets in rudder. Boiler cleaned and 1 stay rod repaired. Boat painted throughout. All wearing parts of machinery overhauled and usual repairs to make good fair wear and tear. Boat and boiler inspected May, 1916.	2,381
Marengo.....	Docked; hull cleaned and tarred. Renewed: Fifty-five feet fender streak, sheathing on deck, stern bearing, and all furnace castings, all tubes in boiler. Repaired: Sills under cabin, stay rods in boiler, skiff, rudders. Ten stay bolts in combustion chamber were repaired and electrically welded and 12 bolts repaired. Boiler scaled. Cabin and hull painted throughout. Other minor repairs to machinery to make good fair wear and tear. Boat and boiler inspected June, 1916.	3,634
Tunica.....	Docked; stern bushing and propeller wheel renewed. Ten feet of round about seam of boiler electrically welded. Other minor repairs to machinery and cabin to make good fair wear and tear. Boat and boiler inspected May, 1916.	2,228

Designation.	Work done.	Cost.
Manchac.....	Docked; hull and cabin rebuilt. Stack furnace and breeching renewed. Machinery thoroughly overhauled and boat painted throughout.	\$7,970.00
Grader No. 1.....	Renewed: Sheathing on deck, sills under cabin, 64 stanchions under deck beams, smokestack, large gate valve in discharge pipe. Cabin painted. Hold and boiler cleaned. All blankets washed. Other minor repairs to machinery to make good fair wear and tear. Inspected June, 1916.	2,114.36
Grader No. 2.....	Renewed: Twenty-four window lights. Repairs to electric light plant, boiler tubes. Sides and rakes of hull calked. Outside of boat painted. Other minor repairs to make good fair wear and tear.	539.46
Neptune.....	Docked; hull painted and calked. Rudder stock and tube renewed. Graving piece put in stern. Propeller shaft and rudder renewed. Stern repaired and reinforced with iron band.	616.87
Beatrice.....	Hull painted and calked. Propeller shaft renewed and other minor repairs to make good wear and tear.	132.63
Derrick No. 1.....	Foundations under derrick renewed, sheathing on deck repaired, other minor repairs to make good fair wear and tear.	987.72
Derrick No. 2.....	Bits on deck renewed, set of bridle rods installed on boom, angle iron placed on spuds; other minor repairs to make good fair wear and tear.	322.21
Derrick No. 3.....	Minor repairs to machinery to make good fair wear and tear.	5.15
Paver No. 1.....	Minor repairs and alterations to make good fair wear and tear and increase efficiency.	155.26
New Orleans.....	Boat screened throughout. All blankets washed. Renewed: Part of sills under forward end of cabin on upper deck, 60 feet of nosing and waterway, 6 stationary fenders. Repairs to guards on upper deck, ranges, stoves, water pipes, canvas on guards, floor in kitchen. Tool locker enlarged by removing bulkhead in one stateroom. New shelves and benches in tool room. Sleeping quarters for waiters rebuilt and large lamp and oil room added.	1,739.44
Baton Rouge.....	Boat screened throughout. Cabin scrubbed and trimmings painted. All blankets washed, 3 stationary fenders and all lashings on swinging fenders renewed. Repairs to ranges, stoves and water pipes.	678.76
Bayou Sara.....	Boat screened throughout. Cabin scrubbed and trimmings painted. Repairs to ranges, stoves, tanks and water pipes.	665.43
Natches.....	Front gallery screened. Minor repairs to toilets, filters, ranges, stoves and water pipes.	190.25
Bayou Goula.....	Front gallery screened, boat cleaned and scrubbed, roof repaired and painted, minor repairs to toilets, ranges, stoves and water pipes.	119.65
Tomas.....	Boat painted throughout. Canvas on office and dining room floor renewed. Hull calked to water line.	176.08
Port Hudson.....	Unusual repairs to ranges, stoves, filters and water pipes to make good wear and tear.	61.60
Cresote plant.....	Suction pipe between circulating pump and river renewed. Furnace rebuilt, coal bins built: 7 cars repaired. All creosote pipes covered with cement. Repairs to cylinder, pumps, coils in tanks, to make good usual wear and tear.	1,742.19
Shop.....	Cracks in boiler repaired by electrical welding. New punch and shear installed. Usual repairs to belts, shafts, pumps, to make good fair wear and tear.	1,408.18
Skiffs.....	One skiff built: 21 skiffs repaired and painted.	266.72
Pump boat.....	Boiler retubed, breeching repaired.	216.65
Wharf.....	Area of wharf increased 8,455 square feet.	2,209.44
Warehouse.....	Minor alterations to increase storage space.	79.83
G. I. pumps.....	Forty-eight galvanized iron pumps repaired.	66.87
Camel Dock.....	Docked; rebuilding is in progress.	477.99
Sectional docks.....	All pumps repaired.	57.00
Barge No. 14.....	Docked; bottom and sides and rakes calked, sheathing repaired. Ends of all rake planks cut off and a piece of creosoted timber put in. Bolts tightened, hold cleaned, capstan overhauled.	375.00
Barge No. 15.....	Docked; bottom, sides, and rakes calked; sheathing repaired, bulkheads repaired, bolts tightened, hold cleaned, capstan oiled.	521.00
Barge No. 65.....	Docked; bottom, sides, and rakes calked; two graving pieces put in gunwales, two bottom planks renewed, bolts tightened, hold cleaned, capstan oiled.	386.00
Barge No. 34.....	Docked; bottom, sides, and rakes calked; two graving pieces put in gunwales, two bottom planks renewed, bolts tightened, hold cleaned, capstan oiled.	466.00
Barge No. 2.....		94.00
Barge No. 16.....		79.00
Barge No. 22.....		66.00
Barge No. 45.....	Sides and rakes calked, bolts tightened, hold cleaned, capstan oiled.	52.00
Barge No. 59.....		139.00
Barge No. 66.....		88.00
Barge No. 3.....		378.00
Barge No. 6.....		121.00
Barge No. 23.....		152.00
Barge No. 35.....	Sides and rakes calked, sheathing renewed, bulkheads repaired, bolts tightened, hold cleaned, capstan oiled.	80.00
Barge No. 36.....		220.00
Barge No. 40.....		403.00
Barge No. 46.....		147.00
Barge No. 26.....		110.00
Barge No. 30.....		172.00
Barge No. 42.....		115.00
Barge No. 53.....	Sides and rakes calked, sheathing repaired, bulkheads repaired, rakes repaired, bolts tightened, hold cleaned, capstan oiled.	242.00
Barge No. 55.....		103.00
Barge No. 56.....		256.00
Barge No. 57.....		207.00
Barge No. 60.....		126.00

Designation.	Work done.	Cost.
Barge No. 21.....	Sides and rakes calked, sheathing repaired, bolts tightened, hold cleaned, capstan oiled.	\$129.00
Barge No. 24.....		83.00
Barge No. 27.....		102.00
Barge No. 41.....	Sides and rakes calked, bulkheads repaired, bolts tightened, hold cleaned, capstan oiled.	290.00
Barge No. 23.....		122.00
Barge No. 25.....		141.00
Barge No. 39.....	Sheathing renewed, bulkheads repaired.....	129.00
Barge No. 1.....		389.00
Barge No. 4.....		40.00
Barge No. 5.....	Sheathing repaired, hold cleaned, bolts tightened, capstan oiled.....	35.00
Barge No. 7.....		30.00
Barge No. 8.....		79.00
Barge No. 37.....		11.00
Barge No. 43.....		36.00
Barge No. 47.....		38.00
Barge No. 48.....		96.00
Barge No. 54.....		11.00
Barge No. 58.....		31.00
Barge No. 63.....		29.00
Barge No. 64.....	Sides and rakes calked, sheathing repaired, rakes repaired, bolts tightened, hold cleaned, capstan oiled.	64.00
Barge No. 9.....		64.00
Barge No. 17.....		342.00
Barge No. 20.....	Ends docked, sides and rakes calked, sheathing repaired, rakes repaired, bolts tightened, hold cleaned, capstan oiled.	118.00
Barge No. 67.....		5.00
Barge No. 28.....		178.00
Barge No. 32.....	Painted with red lead, new false floor in hold, sheathing repaired.....	107.00
Barge No. 44.....	Sheathing repaired and lumber treated for future repairs.....	353.00
Barge No. 49.....	Rakes and sides calked, sheathing renewed, bulkheads repaired, and lumber treated for future repairs.	683.00
Barge No. 29.....	Ends docked, sheathing renewed, bulkheads repaired, rakes repaired, hold cleaned, bolts tightened, capstan oiled.	251.00

In addition to this total charged to the allotment for plant, minor repairs were made in the field to the tugs *Tickfair*, *Tunica*, and *Marengo*, steamer *La-fourche*, grader No. 1, and grader No. 2. The cost of these repairs was charged to the several works on which the plant was engaged.

Care of plant.—Under this head is included such items as fire protection, electric-light service, watchmen, putting out and taking in spars, mooring lines, etc., operating pump boat, cost of two tugs in commission to handle and care for plant, receiving, issuing, and storing property, proportion of general supervision, etc. The total cost was \$10,224.23, averaging about \$95.66 for each large piece of plant. The cost is increased by the fact that the plant is cared for at two widely separated localities—New Orleans, La., and Natchez, Miss.—necessitating a duplication of some of the charges.

Supt. R. H. Bolen was in charge of the engineer depot of the construction, repair, maintenance, and care of plant, under the general direction of Asst. Engineer H. S. Douglas.

The expenditures for the period covered by this report were \$146,838.98, distributed as follows:

New plant	\$68,746.19
Repairs to plant.....	57,218.81
Care of plant.....	10,224.73
Material purchased and unexpended	10,649.25
Total	146,838.98

Condition at end of present year.—A floating plant consisting of 117 large pieces for bank revetment, levee construction, and dredging has been acquired. A fairly complete engineer depot on the river front at New Orleans has been secured. A warehouse, a combined machine, blacksmith, and carpenter shop has been built, and a creosoting plant has been installed. Other equipment necessary for building new plant and repairing that on hand has been acquired. Suitable railroad tracks have been built and connected with the Public Belt Railway system of the city of New Orleans. The general condition of the plant is good. The project is not susceptible of completion, as new plant must be built from time to time and existing plant repaired, maintained, and cared for. The expenditures on existing project have been \$813,523.26 for new work (plant) and \$642,915.09 for maintenance (repairs and care), making a total of \$1,456,438.35.

Local cooperation.—None.

Effect of improvement.—Acquisition of the necessary plant to prosecute work by day labor.

Proposed operations.—To repair, maintain, and care for the existing plant and to construct such new plant as may be required.

FINANCIAL SUMMARY.

Amount expended on all projects to June 30, 1917, exclusive of receipts from sales, etc., formerly included:

New work.....	\$814,918.71
Maintenance.....	613,176.53

Total expended.....	1,428,095.24
Total appropriations to June 30, 1917.....	1,462,500.00

Fiscal year ending June 30.	1913	1914	1915	1916	1917
Expended for new work.....	\$56,448.66	\$44,058.02	\$39,013.92	\$30,006.93	\$80,141.64
Expended for maintenance.....	51,849.71	8,908.76	67,917.96	70,679.22	61,006.40
Total expended.....	108,298.37	52,966.78	106,931.88	100,686.15	141,148.04
Appropriated or allotted.....	87,000.00	60,000.00	105,000.00	160,000.00	

July 1, 1916, balance unexpended.....	\$15,552.80
Amount appropriated by river and harbor act approved July 27, 1916.....	160,000.00
	175,552.80

June 30, 1917, amount expended during fiscal year, exclusive of receipts from sales:	
For new work.....	\$80,141.64
For maintenance.....	61,006.40
	141,148.04

July 1, 1917, balance unexpended.....	34,404.76
July 1, 1917, outstanding liabilities.....	19,207.22

July 1, 1917, balance available for fiscal year ending June 30, 1918 ..	15,197.54
---	-----------

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
Aug. 18, 1894 (sundry civil).....	Sept. 8, 1894	\$10,000
June 4, 1897 (sundry civil).....	Aug. 20, 1897	20,000
July 1, 1898 (sundry civil).....	Mar. 13, 1899	5,556
Mar. 3, 1899 (sundry civil).....	Mar. 13, 1899	64,444
June 6, 1900 (sundry civil).....	July 20, 1900	25,000
June 13, 1902 (river and harbor).....	July 12, 1902	111,000
Mar. 3, 1903 (sundry civil).....	Apr. 16, 1903	22,000
Do.....	July 21, 1903	25,000
Apr. 28, 1904 (sundry civil).....	Apr. 1, 1904	38,000
Mar. 3, 1905 (sundry civil).....	Apr. 26, 1905	45,000
June 30, 1906 (sundry civil).....	June 28, 1906	55,000
Mar. 2, 1907 (river and harbor).....	Apr. 6, 1907	65,000
May 27, 1908 (sundry civil).....	May 4, 1908	55,000
Do.....	(1)	1,500
Mar. 4, 1909 (sundry civil).....	Apr. 28, 1909	106,000
June 25, 1910 (sundry civil).....	Apr. 30, 1910	109,000
June 25, 1910 (river and harbor).....	July 6, 1910	122,000
Feb. 27, 1911 (river and harbor).....	May 3, 1911	95,000
July 25, 1912 (river and harbor).....	Aug. 3, 1912	85,000
Mar. 4, 1913 (river and harbor).....	Apr. 30, 1913	87,000
Oct. 2, 1914 (river and harbor).....	Oct. 15, 1914	60,000
Mar. 4, 1915 (river and harbor).....	Apr. 18, 1915	105,000
July 27, 1916 (river and harbor).....	Aug. 14, 1916	160,000
Total.....		1,462,500

¹ By transfer.

² Original amount allotted, \$100,000; \$5,000 transferred to Kemp Bend revetment.

(b) Levee plant.

No project exists for levee plant. Such plant as is required is purchased from time to time and pertains to all levee districts.

Operations and results prior to the present year.—Three levee machines of the revolving locomotive-crane type, one steel hull, two wooden hulls, three quarter boats, and one plant for levee paving have been built and maintained. The cost for new work was \$142,582.09. The cost of maintenance, which was not absorbed in cost of work accomplished, was \$6,633.15. The result has been to decrease the cost of levee construction, to greatly improve the methods of construction, and to facilitate high-water protection.

Operations and results during the present year.—The cost of maintenance has been absorbed in the cost of the work upon which the plant was engaged.

Condition at end of year.—All levee plant is in good condition and in successful operation. One levee machine of 72-foot radius was repaired and converted into a machine of 100-foot radius at a cost of \$11,498.46. Another steel barge was added to the plant at a cost of \$21,075.90. The amount of plant is insufficient to realize the greatest economy in levee work. An addition of two locomotive cranes of 125-foot radius and 20-ton capacity, with all attendant plant, and 14 creosoted wooden standard barges are needed to give the required economy below Red River. The work of the levee machine is greatly hampered by a shortage of barges, which are needed for transporting coal, gravel, sand, trucks, and supplies.

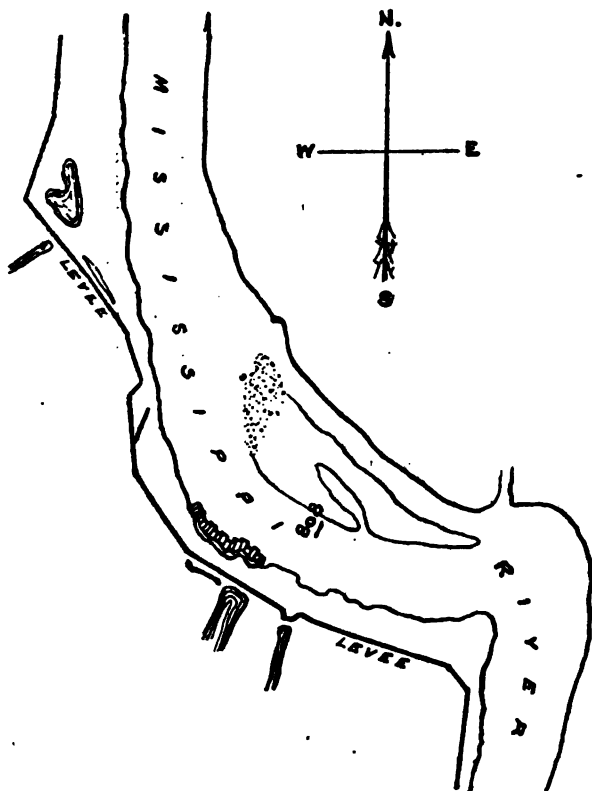
Proposed operations.—None.

Effect of improvement.—The introduction of Government-owned plant has cheapened the cost of levee work, especially below Red River, and added greatly to the safety of the levees during floods and reduced the cost of high-water protection.

The following inclosures (maps) accompany and form part of this report:

1. Hard Times Bend, La.
2. Boudurant Chute, La.
3. Kempe Bend, La.
4. Natchez and Vidalia Harbors, Miss. and La.
5. Grand Bay, La.
6. New Orleans Harbor, La.
7. Levee map, fourth district.
8. Lower Tensas levee district profile.
9. Atchafalaya levee district profile.
10. Lafourche levee district profile.
11. Barataria levee district profile.
12. Pontchartrain levee district profile.
13. Lake Borgne levee district profile.

G. McC. DREW,
Lieutenant Colonel, United States Army, Retired.

PLATE N^o 5.

New Orleans, La.

E. M. O'Neil

Lt. Col. U.S. Army.

To Accompany Annual Report 1916-1917.

MISSISSIPPI RIVER COMMISSION
FOURTH DISTRICT**GRAND BAY.**

CONDITION OF WORK JUNE 30, 1917.

Scale of Miles.

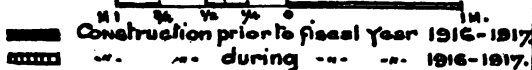
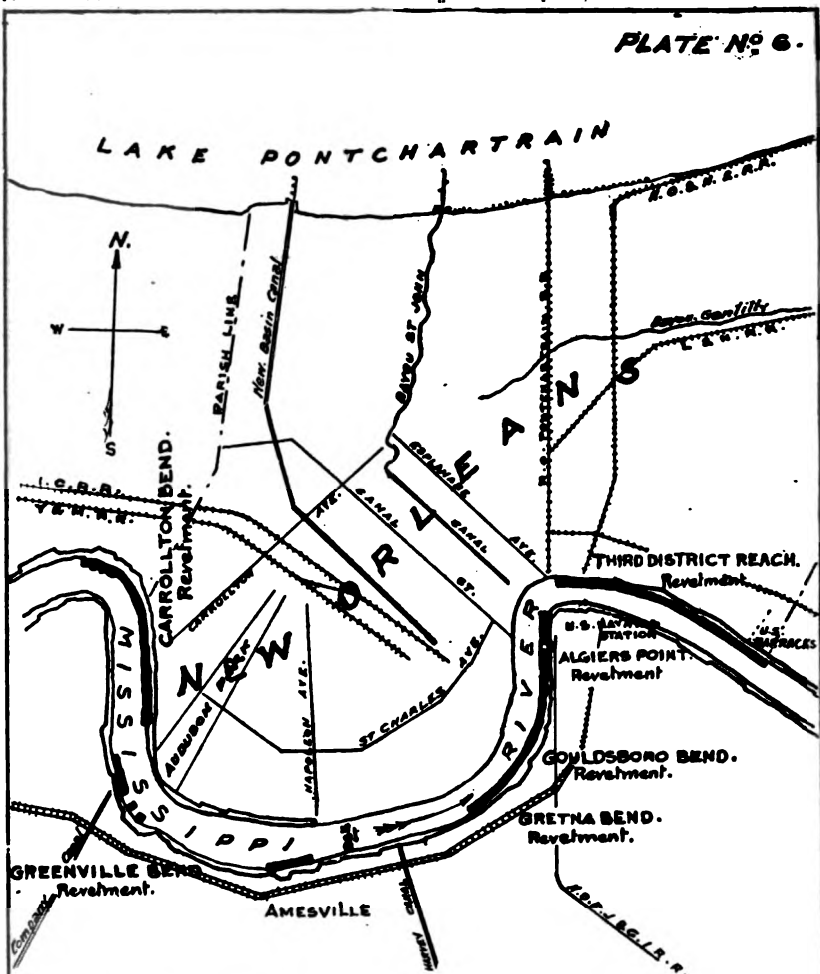


PLATE No. 6.



New Orleans, La.

Wm. C. Davis
Lt. Col. U.S. Army.

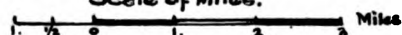
To Accompany Annual Report, 1916-1917.

MISSISSIPPI RIVER COMMISSION
FOURTH DISTRICT.

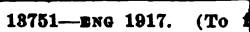
NEW ORLEANS HARBOR, LA.

CONDITION OF WORK JUNE 30, 1917.

Scale of Miles.



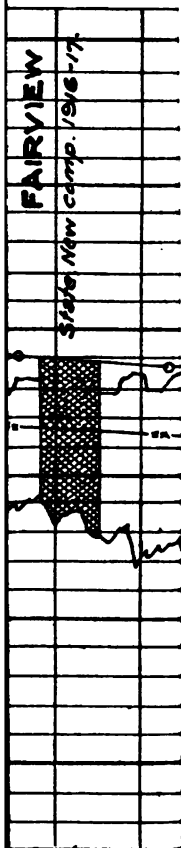
Construction prior to fiscal year 1916-1917.
during " " " " 1916-1917.

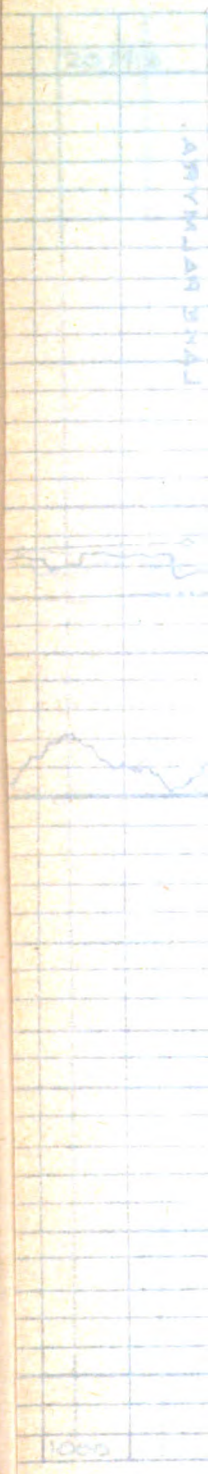


Orleans,
pany Annual
ending Ju

[Signature]
Lieut. Col

blished Com
heat Water 19
est -- 11
es built by
es enlarged
es built by
es enlarged





MISSISSIPPI RIVER COMMISSION.

PLATE NO 9.

RIVER COMMISSION.
NORTH DISTRICT.

ALAYA LEVEES.

THE DIRECTION OF
M^{rs} C. Derby, U.S. Army.

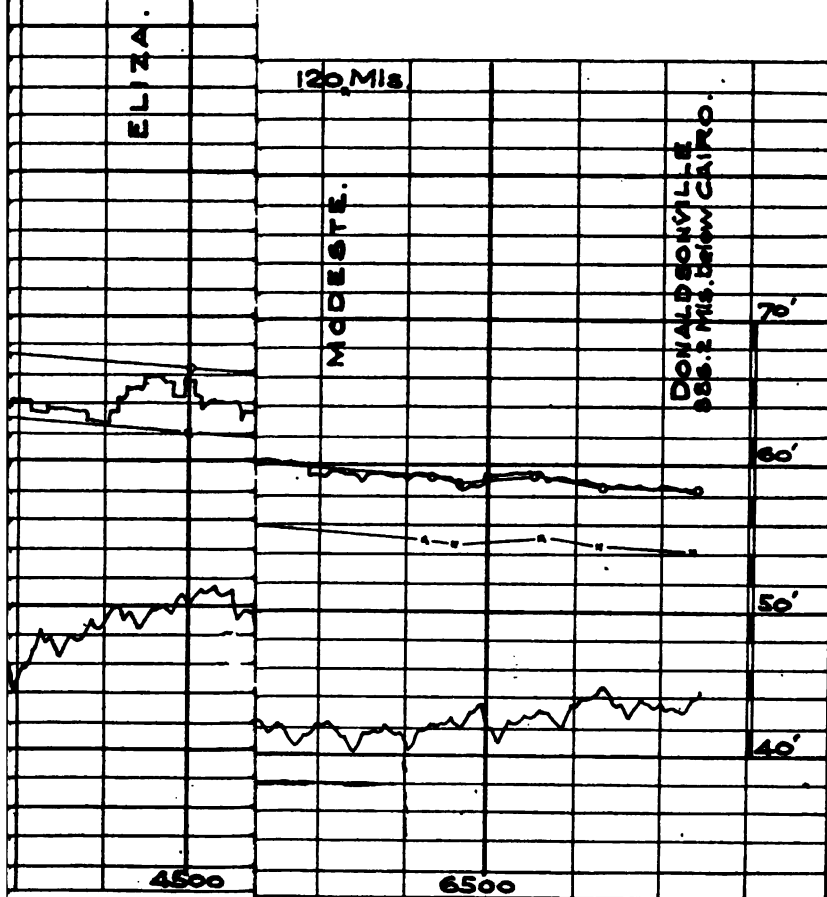
bloch, Asst. Engineer.

by 682 May 1917.

by 682 May 1917.

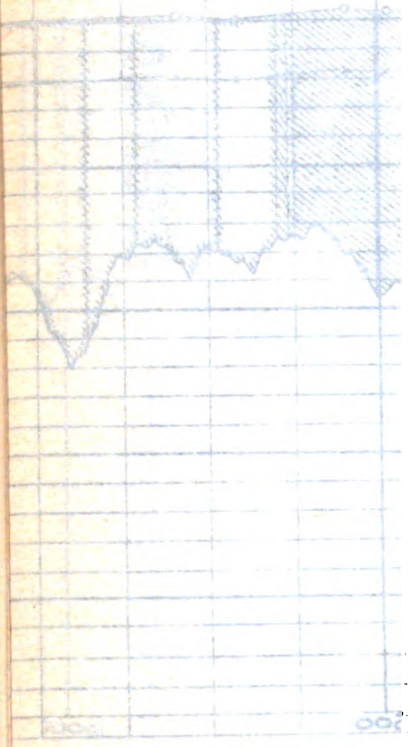
Scale of Feet.

10000' 20000' 30000' 40000'



21 M. 01

1. 1st day of the month
 2. 2nd day of the month
 3. 3rd day of the month
 4. 4th day of the month
 5. 5th day of the month
 6. 6th day of the month
 7. 7th day of the month
 8. 8th day of the month
 9. 9th day of the month
 10. 10th day of the month
 11. 11th day of the month
 12. 12th day of the month
 13. 13th day of the month
 14. 14th day of the month
 15. 15th day of the month
 16. 16th day of the month
 17. 17th day of the month
 18. 18th day of the month
 19. 19th day of the month
 20. 20th day of the month
 21. 21st day of the month
 22. 22nd day of the month
 23. 23rd day of the month
 24. 24th day of the month
 25. 25th day of the month
 26. 26th day of the month
 27. 27th day of the month
 28. 28th day of the month
 29. 29th day of the month
 30. 30th day of the month
 31. 31st day of the month



1000

00

PEI RIVER COMMISSION

PLATE No 10

RIVER COMMISSION.

DISTRICT.

THE LEVEES.

DIRECTION OF

C. Derby, U.S. Army.

ch, Asst. Engineer.

May 1917.

May 1917.

Scale of Feet.
10000 20000 30000 40000

LUCKY

COMPANY CANAL.

80 Mls.

GOULDSBORO.

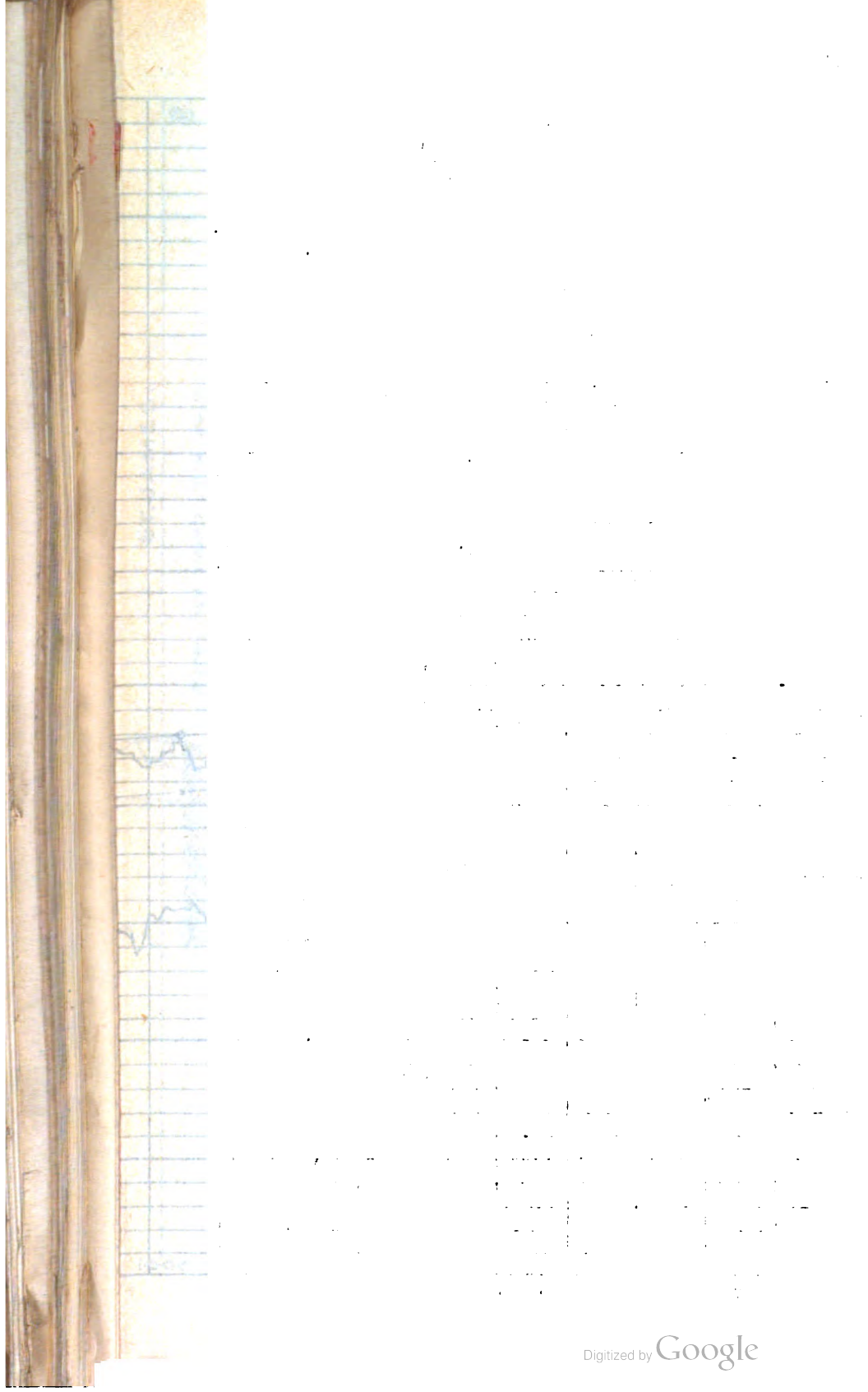
50'

40'

30'

20'

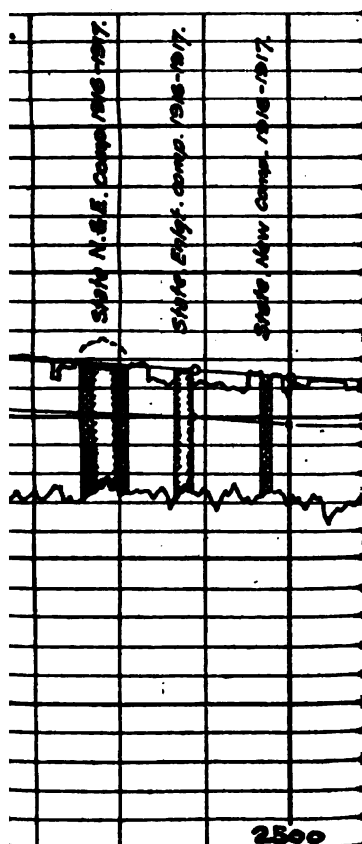
4000

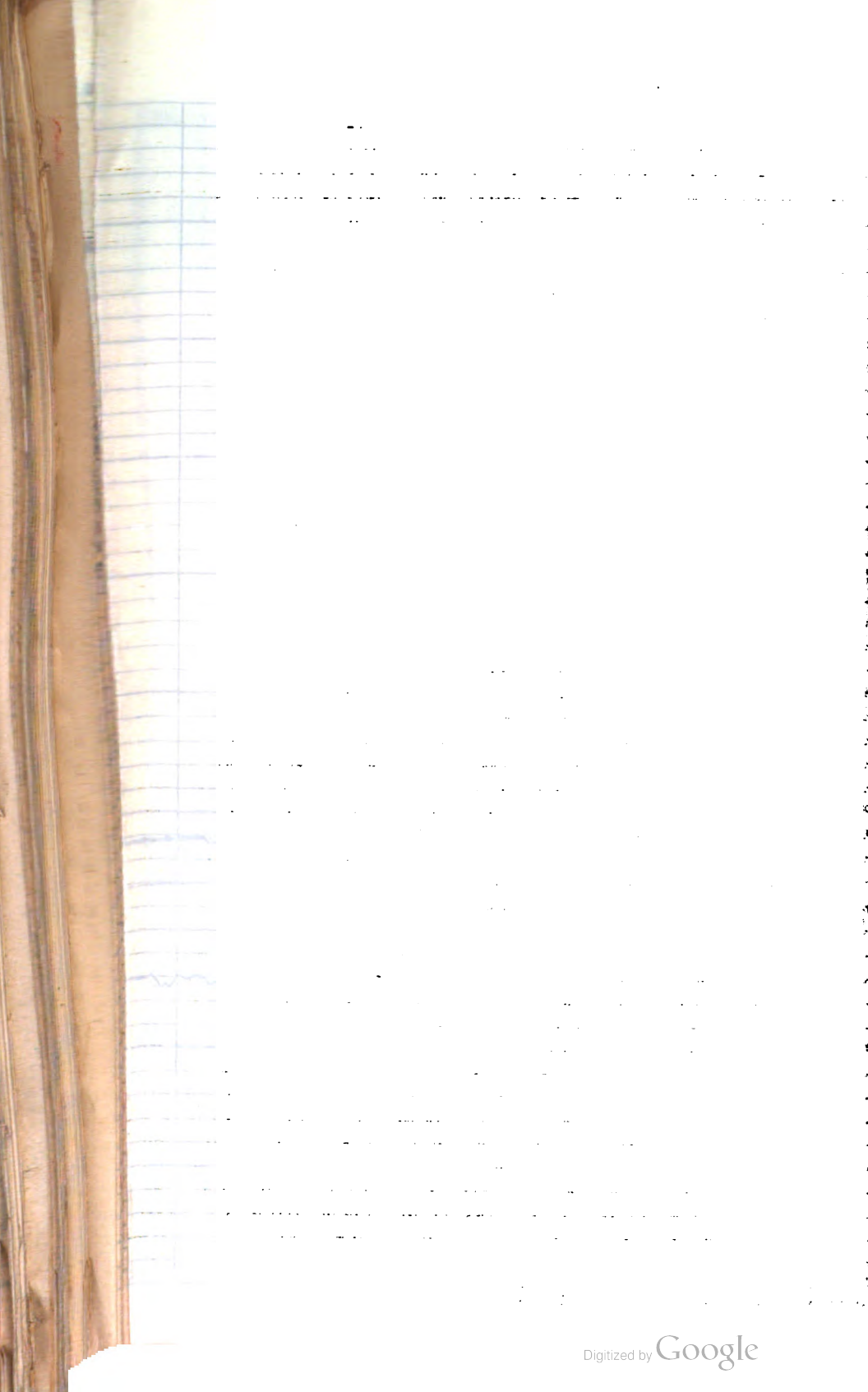


New Orleans
To accompany Ann
fiscal year ending,

Eme
Lieut.

- Established
- Highest Water
- ▨ Levees built
- ▤ Levees enlarged
- Levees built
- ▥ Levees enlarged





PI RIVER COMMISSION.
DISTRICT.
RAIN LEVEES.

THE DIRECTION OF
EC. Derby, U.S. Army.
h., Asst. Engineer.

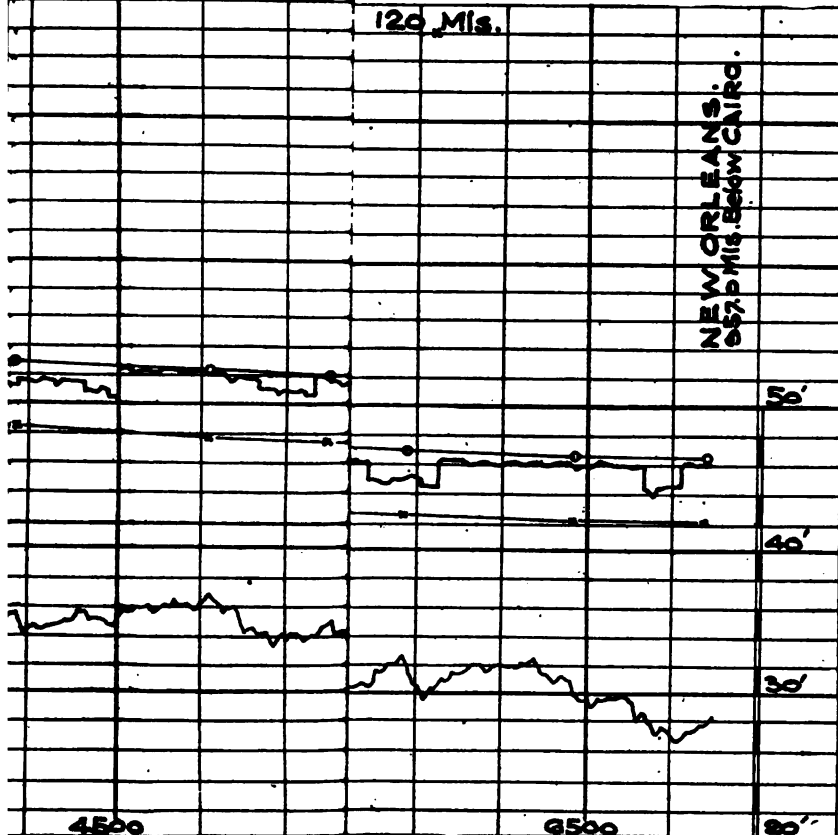
B.B. May. 1917.

B.B. May 1917.

Scale of Feet.
0000' 20000' 20000' 40000'

120 Mis.

NEW ORLEANS.
657.5 Mis. Below CAIRO.





RIVER COMMISSION

0 Miles

PLATE NO 13

COMMISSION.

RICT.

LEVEES.

CTION OF

rby, U.S. Army.

t. Engineer.

May 1917.

May 1917.

00' 20000' 40000'

State New & Enlgt. comp 1916-1917

PT. A LA HACHE.

Point a la Hache, New & Enlgt. comp. Dec. 1916.

State, New & Enlgt. 1916-1917.

2500

4000

40'

30'

20'

10'

APPENDIX 5.

Topical index to the Annual Report of the Mississippi River Commission for 1917.

Allotments:	Page.
Gauging the waters of the Mississippi River and its tributaries.....	3417
Made during year.....	3416
Reallotments made during the year.....	3417
Titles of, in charge of secretary Mississippi River Commission.....	3461
Appendixes, list of, to Annual Report Mississippi River Commission.....	3461
Appropriations:	
Expended under the Mississippi River Commission.....	3424
Gauging the waters of the Mississippi River and its tributaries.....	3417
Recommended.....	3423
Bank protection. (See Revetments.)	
Bars:	
Mississippi River below Cairo—	
Condition of channel at end of fiscal year.....	3419, 3471
In original condition.....	3463
Depths and widths of channel during lowest stages of year.....	3423
Dimensions of channels through bars, low-water season of 1916 (Table No. 6).....	3498
Inspection of channels.....	3464
Names and depths over; low-water season of 1916 (Table No. 5).....	3494-3497
Notes on conditions and results of dredging at each bar dredged, low-water season of 1916.....	3467
Summary of dredging operations, 1916 (Table No. 7).....	3499
Surveys.....	3464
Old river channel maintained.....	3613
Boats. (See Plant.)	
Borings at Helena, Ark., continued.....	3524
Buildings and grounds, West Memphis, Ark.....	3470
Charts and maps:	
Contract for printing maps of resurvey entered into.....	3462
Issued and sold during year.....	3483
Coal, amount received, etc.....	3471
Commercial statistics.....	3480-3482
Contracts, abstract of, in force:	
Secretary.....	3479
First and second districts.....	3546
Third district.....	3590
Fourth district, given following each work.....	
Crescenting plant:	
First and second districts, repairs, etc.....	3543
Fourth district, repairs, etc.....	3652, 3653
Crevasses in Arkansas River closed.....	3582
Dam in Wolf River.....	3469
Discharge, Mississippi River and tributaries reported.....	3462
Docks, marine railway, at West Memphis, Ark.....	3470
Dredges and dredging:	
Mississippi River, Cairo to Head of Passes—	
Cost of dredging operations, 1916 (Table No. 4).....	3492
Division of time during dredging season of 1916 (Table No. 7).....	3499
In Memphis Harbor.....	3468, 3518
Material moved during year.....	3464
Operations.....	3464-3468
Plant, etc., in connection with.....	3470
Project.....	3463
Old River, dredging operations.....	3613

	Page.
Engineer districts under Mississippi River Commission, limits of and officers in charge:	
First and second.....	3505
Third.....	3553
Fourth.....	3595
Estimate of funds that can be profitably expended during the fiscal year 1919..	3423
Experimental revetments.....	3531
Extension of jurisdiction of Mississippi River Commission.....	3414
Financial statements:	
Consolidated statements.....	3423
Secretary.....	3475-3477
First and second districts.....	3548-3553
Third district.....	3591-3595
Fourth district.....	3595-3656
Flood-control act of March 1, 1917, policy of commission for work under...	3414, 3503
General repairs and stone, fourth district.....	3624
Gauges:	
Highest and lowest gauge readings, Mississippi River and tributaries (Table No. 1).....	3484-3487
Highest gauge readings, Mississippi River and tributaries, 1917, to June 30 (Table No. 2).....	3488
Hydrographs, Mississippi River, Cairo to Fort Jackson, June 1, 1916, to May 31, 1917 (pl. No. 1).....	3502
Inspection and maintenance of.....	3462
Maximum heights of high water above mean Gulf level, 1917 (Table No. 3)...	3489
Profile high water, 1916 (pl. No. 2).....	3502
Stages during the year.....	3420
Harbors:	
Greenville, Miss.....	3560
Memphis, Tenn.....	3419, 3468, 3518
Mouth of Yazoo and harbor of Vicksburg.....	3574
Natchez and Vidalia.....	3606
New Orleans, La.....	3620
High-water operations:	
First and second districts.....	3540
Third district.....	3589
Fourth district, given under each levee district.....	
Laws:	
Affecting the Mississippi River Commission, July 1, 1916, to June 30, 1917.....	3502-3505
Extract from organic act defining duties of the Mississippi River Commission.....	3411
Levees:	
Construction, etc.—	
Cape Girardeau, Mo., to Rock Island, Ill.....	3472-3475
First and second districts.....	3531-3540
Third district.....	3581-3585
Fourth district.....	3625-3649
Loss by abandonment and other causes.....	3421
Machine, levee building.....	3422
Table showing area of land protected, condition and extent of levees in all districts below Cape Girardeau, Mo.....	3421
Maps. (See Charts and maps.)	
Mattresses. (See Revetments.)	
Mississippi River Commission:	
Duties.....	3411-3413
Members.....	3418
Project.....	3411-3415
Sessions of.....	3418, 3424
Summary of work.....	3418-3423
Navigation. (See Bars.)	
Plant:	
Care and repair of, in charge of secretary.....	3470
First and second districts.....	3541-3546
Third district.....	3586-3588
Fourth district.....	3651-3655
Inspection.....	3471

Plant—Continued.

	Page.
New plant—	
First and second districts.....	3541
Third district.....	3586
Fourth district.....	3652
Plates, list of, accompanying report of secretary.....	3474
First and second districts.....	3546
Fourth district.....	3656
Project for works under Mississippi River Commission.....	3611-3615
Policy of commission for work under flood-control act of March 1, 1917.....	3414
Red, Atchafalaya, and Mississippi Rivers, junction of, operations, etc.....	3612-3615
Revetments—location, projects, operations, etc.:	
Arkansas River.....	3578-3581
Mississippi River—	
Cost of, June 1, 1916, to May 31, 1917, first and second districts.....	3533
Third district.....	3581
Fourth district.....	3622
Experimental.....	3531
Operations during the year—	
First and second districts.....	3505-3529
Third district.....	3554-3580
Fourth district.....	3596-3621
Table showing effective length and amount built during the year.....	3420
Statistics. (See Commercial statistics.)	
Subsistence, cost of, at dredge depot, West Memphis, Ark.....	3471
Surveys:	
Atchafalaya River.....	3463
In connection with dredging operations.....	3464
In the engineer districts—	
First and second districts.....	3540
Third district.....	3585
Fourth district.....	3650
Project.....	3462
Tables. (See also Bars, Commercial statistics, etc.)	
List of, accompanying report of secretary.....	3474
Yazoo River, mouth of, and Vicksburg Harbor.....	3574

SUPERVISION OF THE HARBOR OF NEW YORK.

REPORT OF CAPT. W. G. CUTLER, UNITED STATES NAVY, RETIRED.

When I assumed the duties of supervisor of the harbor of New York on April 25, 1917, I found a well organized and efficient office force and an effective patrol system for the prevention of obstructive and injurious deposits within the harbor and its approaches and the adjacent waters so far as the number of patrol vessels available would allow.

2. NOTICES.

During the past fiscal year notices in the form of copies of the law have been distributed from time to time for the information and guidance of all concerned.

3. SYSTEM OF CHECKING.

The following table shows deductions made on contracts for material escaping from dumpers while in transit or otherwise improperly disposed of or unaccounted for during the past fiscal year:

	Cubic yards.
United States Engineer Department.....	311
Department of Docks and Ferries.....	8, 153
State of New York.....	1, 727
United States Navy Department.....	2, 607
Private contract.....	184
Total.....	12, 982

At an estimated average of \$0.35 per cubic yard, amounting to \$4,543.70.

Under contracts with above-noted departments 94 pocket loads, averaging 150 cubic yards each, or a total of 14,100 cubic yards, or approximately 22 scow loads, were checked upon reports of the patrol vessels as failing to clear at the proper point of deposit outside the lightship and were kept under surveillance until returned to point of loading, to be remeasured before reloading. The illegal disposition of this amount of material would not only have proven a large item of gain to the contractor, but would eventually have caused much injury to the channels.

4. ENFORCEMENT OF THE ACT OF AUGUST 18, 1894.

The outside patrol vessels see to the enforcement of the provisions of this act which requires the main channels to be kept free from small craft engaged in fishing or dredging for shellfish or in anyway interfering with the safe navigation of these channels by ocean steamships or other vessels of deep draft.

5. ENFORCEMENT OF THE ACT OF MAY 28, 1908, AND FEBRUARY 16, 1909.

The strict surveillance kept over scows and vessels coming under the provisions of section 8 of the above act in relation to the equipment required to be carried on them eliminated the necessity for any cases being referred for the action of the courts during the past fiscal year. The owners and others responsible immediately replaced any defective or deficient articles upon notification.

6. FLOATING PLANT.

Cost of operating patrol vessels, fiscal year ending June 30, 1917.

	Vigilant.	Lamont.	Cerberus.	Scout.	Nimrod.	Lookout.	Total.
Salaries.....	\$7,028.67	\$7,594.83	\$7,748.17	\$7,218.16	\$7,120.51	(*)	\$36,710.34
Coal.....	3,855.69	3,498.80	3,585.73	3,262.10	3,357.50		17,559.82
Oil.....	154.53	176.76	188.90	123.72	199.32		843.23
Water.....	132.00	86.30	96.00	88.26	92.00		494.56
Subsistence.....	1,980.72	1,619.77	1,583.19	1,567.21	1,630.22	\$182.29	8,563.40
Docking, repairs.....	2,473.55	990.27	985.35	2,326.96	504.03	105.00	7,385.16
Supplies.....	802.49	661.73	535.29	522.36	605.90	10.80	3,138.57
Gasoline.....						220.50	220.50
Total.....	16,427.65	14,628.46	14,722.63	15,108.77	13,509.48	518.59	74,915.58

* Deputy Inspector and master of Vigilant, salary charged to "Office expenses," 12 months, at \$150. \$1,800

* Deputy Inspector and master of Nimrod, salary charged to "Office expenses," 5 months, at \$140. 700

* Deputy Inspector and mate of Lookout, salary charged to "Office expenses," 12 months, at \$100. 1,200

Total..... 3,700

The sum of \$75,000 was appropriated by the sundry civil act approved July 1, 1916, for the purchase or construction of a patrol vessel to take the place of the patrol vessel *Nimrod*. Efforts were made to obtain a suitable seagoing vessel by purchase or construction, but owing to the abnormal conditions prevailing it was found impossible to obtain a suitable vessel within the limits of the funds available. As explained in previous reports, only seagoing vessels should be acquired by this office hereafter. At present, tugs that tow scows to the dumping grounds outside Scotland Lightship are large seagoing vessels, and, having scows in tow, can make better weather in a seaway than a vessel without a tow, and it is essential that the patrol boats follow these tows to sea in all weathers. Although a seagoing vessel is needed, the power of a seagoing tugboat is not required. All likely vessels for sale inspected, were found to be old, generally unsuitable, and held at prohibitive figures. Plans and specifications were prepared for a suitable vessel with a wooden hull and steel house, embracing 15 alternative proposals for the purpose of developing all possibilities of building the boat within the amount of the appropriation. Copies of the specifications were forwarded to a large number of likely bidders and widely advertised. No interest whatever was shown by bidders, either in reply to the advertisement or from those shipbuilding concerns to whom specifications were sent.

I therefore consider that owing to war conditions the time is utterly inopportune, and concur in the recommendation of my predecessors that the matter be held in abeyance and that the available

balance of this allotment be increased to at least \$100,000, so that the attempt may be renewed at a more favorable moment.

Though a new vessel is urgently needed, as fully set forth by my predecessors, nevertheless it would be folly to procure a vessel in any way unsuited for the services required.

7. OFFICE.

Cost of operating under "Office expenses," fiscal year ending June 30, 1917.

Salaries ¹	\$9,820.00
Stationery and printing	223.92
Traveling expenses	66.60
Incidentals, including telephone, telegrams, etc	148.99
Total	10,259.51

8. AMOUNT OF MATERIAL DEPOSITED.

MATERIAL DEPOSITED AT THE MOUTH OF THE HARBOR, UNDER SUPERVISION.

	Cubic yards.
From 1890 to 1916	304,688,060
Fiscal year 1917:	
Dredgings from Red Hook and other channels deposited under supervision of United States Army Engineers in an average depth of 80 feet of water in the neighborhood of Scotland Lightship	597,213
Other United States Government work	663,128
Total resulting from Government work	1,260,341
Other material	7,914,754
Total for fiscal year 1917	9,175,095
Total from 1890 to 1917	313,863,175

MATERIAL DEPOSITED BEHIND BULKHEADS, UNDER SUPERVISION.

From 1890 to 1916	120,125,465
Fiscal year 1917	7,667,146
Total	127,792,611

DEPOSITED, UNDER SUPERVISION, CITY GARBAGE, AT BARREN ISLAND, FOR REDUCTION.

From date of operation of garbage-reduction plant in 1897 to June 30, 1916	4,848,332
Fiscal year 1917	209,450
Total	5,057,782

DEPOSITED IN HUDSON RIVER AT SUCH POINTS AS AGREED TO AFTER CONSULTATION WITH THE UNITED STATES DISTRICT ENGINEER OFFICER.

From 1907 to June 30, 1916	1,968,576
Fiscal year 1917	103,277
Total	2,071,853

Of this total amount, 865,530 cubic yards resulted from operations by the United States.

¹ Includes salary deputy inspector and master patrol vessel *Vigilant* for one year, \$1,800; deputy inspector and master patrol vessel *Nimrod* for five months, \$700; deputy inspector and mate *Lookout* for one year, \$1,200; total, \$3,700.

3664 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1917.

DEPOSITED IN LONG ISLAND SOUND AND FISHERS ISLAND SOUND.

From 1896 to June 30, 1916.....	28, 294, 840
Fiscal year 1917.....	711, 471
Total.....	29, 006, 311

DEPOSITED IN EAST RIVER, NEW YORK.

From 1896 to June 30, 1911, stone resulting from operations of the United States.....	197, 991
Fiscal year 1916, clay, sand, and stone over line of East River tunnels.....	484, 446
Fiscal year 1917, clay, sand, and stone over line of East River tunnels.....	872, 985
Total.....	1, 505, 422

Total amount deposited under supervision at sea, Long Island and Fishers Island Sounds, Hudson and East Rivers, and behind bulkheads, since establishment of office of supervisor to June 30, 1916.....	480, 312, 970
Total amount deposited during fiscal year 1917.....	18, 739, 424
Total.....	479, 052, 394

The records show that the amount of material moved upon the waters of the harbor of New York under the jurisdiction of the supervisor has increased from 9,711,141 cubic yards during the fiscal year 1890 to 18,739,424 cubic yards moved during the fiscal year ending June 30, 1917.

During the fiscal year 1890, 6,535,175 cubic yards of waste material was deposited near the mouth of the harbor, 2,822,548 cubic yards was used for filling behind bulkheads, and 353,418 cubic yards was deposited in Long Island Sound. During the fiscal year ending June 30, 1917, 9,175,095 cubic yards was deposited at the mouth of the harbor; 7,667,146 cubic yards was utilized for filling behind bulkheads; 814,748 cubic yards was deposited in Hudson River, Long Island and Fishers Island Sounds; 872,985 cubic yards of clay, sand, and stone deposited in the East River over the line of tunnels (to be removed on completion of the work); and 209,450 cubic yards of city garbage, dead animals, etc., was deposited on shore at Barren Island for reduction.

The number of permits issued during the past fiscal year ending June 30, 1917, was 12,130; the average number of tows daily to sea was 20, and the average number of scows daily to sea was 30.

As shown by the foregoing statements, the total amount of material deposited at the mouth of the harbor and in Long Island Sound combined since 1890 is 342,869,486 cubic yards.

During the fiscal year ending June 30, 1917, 18,739,424 cubic yards of material—mud, sand, city refuse, garbage, cellar dirt, ashes, lime, and other material—have been moved and deposited outside the harbor at properly designated places and behind bulkheads in the neighborhood of New York, as per the following recapitulation:

Place of deposit.	Kind of material.	Amount.
		<i>Cu. yards.</i>
Mouth of harbor, outside of Scotland Lightship.	Mud, sand, city refuse, etc.	9, 175, 095
Long Island Sound.	Mud, shells, etc.	711, 177
Fishers Island Sound.	Mud, sand, and shells.	294
East River.	Clay, sand, and stone over line of tunnels.	872, 085
Hudson River.	Sand and mud.	102, 277
Do.	Mud, dirt, ashes, etc., behind bulkheads and on shore for filling.	211, 302
East River.	do.	2, 384, 136
Harlem River.	do.	51, 350
Passaic River.	do.	632, 842
Rahway River.	do.	113, 500
Shrewsbury River.	do.	203, 415
Newark Bay.	do.	1, 280, 284
New York Bay.	do.	359, 950
Jamaica Bay.	do.	60, 715
Statens Island Sound.	do.	2, 290, 177
New York Bay (Central Railroad of New Jersey, Port Liberty, N. J.).	do.	67, 225
New York Bay (Pennsylvania Railroad Co., Greenville, N. J.).	do.	12, 800
Barron Island.	Garbage, dead animals, etc., ashore for reduction.	209, 450
Total.		18, 739, 424

9. VIOLATIONS OF LAW.

(A) *Status of cases referred to the United States attorneys with recommendation that proceedings be instituted with a view to prosecution of the parties responsible, pending at end of fiscal year 1916, and action to end of fiscal year 1917.*

No. 173. Tug "Underwriter."—Boston Towboat Co., owners; William J. McNeely, master; Morris & Cumings Dredging Co., owners of dumpers.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1914 (Appendix YY, p. 8298).

November 25, 1916. Final decree in favor of United States entered, without costs. Case closed. (C. 239.)

No. 211. Tug "Gerry."—National Dredging Co., owners; George Sjolund, master; Dailey & Ivins, owners of the dumper.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, pp. 3533 and 3534).

June 30, 1917. Case pending. (C. 312.)

No. 231. Tug "Luther O. Ward."—Peter Cahill, owner; J. Slattery, master; Coastwise Dredging Co., owners of the dumper.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, p. 3540).

June 30, 1917. Case pending. (C. 339.)

No. 234. Tug "Bouker No. 2."—Bouker Contracting Co., owners; George Benson, master; Taylor Dredging Co. and Martin Healy, owners of the dumpers.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, p. 3541).

June 30, 1917. Case pending. (C. 343.)

No. 247. Steamship "Barbarossa."—North German Lloyd Steamship Co., owners.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, p. 3545).

June 30, 1917. Case pending. (C. 357.)

No. 262. Tug "P. J. T. Co., No. 7," and dumper "Olympia."—Owners of tug, Port Johnson Towing Co.; owners of the dumper, estate of M. H. Healey.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, p. 3551).

June 30, 1917. Case pending. (C. 403.)

No. 263. *Tug "Bismarck" and dumper "Sea Bird."*—Owners of tug, Cahill Towing Line; owners of dumper, O'Brien Bros.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, pp. 3551 and 3552).

November 25, 1916. Final decree in favor of United States entered, principal \$250, and costs \$24.40. Case closed. (C. 414.)

No. 264. *Tug "Anna W." and dumper "D. & I. No. 5."*—Owners of tug, Cahill Towing Line; owners of the dumper, Dalley & Ivins.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, p. 3552).

June 30, 1917. Case pending. (C. 418.)

No. 265. *Tug "Edward Murray."*—Owners, Hudson Navigation Co.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, p. 3552).

June 30, 1917. Papers returned by United States attorney with recommendation that no further action be taken because of insufficient evidence to warrant criminal proceedings. Case closed. (C. 419.)

No. 266. *Tug "P. J. T. Co., No. 7," and dumper "22 M. T. & T."*—Owners of tug, Port Johnson Towing Co.; owners of dumper, Moran Towing & Transportation Co.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, pp. 3552 and 3553).

June 30, 1917. Case pending. (C. 413.)

No. 267. *Tug "Joshua Lovett" and dumper "V-4."*—Owners of the tug, Taylor Dredging Co.; owners of dumper, J. & J. McSpirit.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, p. 3553).

June 30, 1917. Case pending. (C. 427.)

No. 268. *Tug "Princess" and dumper "D. & I. No. 2."*—Cahill Towing Line, owners of tug; Dalley & Ivins, owners of dumper.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, p. 3553).

June 30, 1917. Case pending. (C. 428.)

No. 269. *Tug "Bouker No. 2" and dumper "74-H."*—Owners of tug and dumper, Bouker Contracting Co.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, p. 3553).

June 11, 1917. Final decree in favor of United States entered, principal \$250 and costs \$23.40. Case closed. (C. 432.)

No. 270. *Tug "Bismarck" and dumper "Sea Bird."*—Owners of tug, Cahill Towing Line; owners of dumper, O'Brien Bros.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, p. 3553).

November 25, 1916. Final decree in favor of United States entered, principal \$250 and costs \$24.40. Case closed. (C. 433.)

No. 271. *Tug "O. L. Halenbeck" and dumper "Sea King."*—Owners of tug, Cahill Towing Line; owners of the dumper, O'Brien Bros.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, p. 3554).

November 25, 1916. Final decree in favor of United States entered, principal \$250 and costs \$24.40. Case closed. (C. 437.)

No. 272. *Tug "Anna W." and dumper "D. & I. No. 3."*—Cahill Towing Line, owners of tug; Dalley & Ivins, owners of the dumper.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, p. 3554).

June 30, 1917. Case pending. (C. 439.)

No. 273. *Tug "Bismarck" and dumper "Sea Gull."*—Cahill Towing Line, owners of tug; O'Brien Bros., owners of the dumper.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, p. 3554).

November 25, 1916. Final decree in favor of United States, principal \$250 and costs \$24.40. Case closed. (C. 445.)

No. 274. International Auto Repair Co.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, p. 3554).

June 30, 1917. Case pending. (C. 449.)

No. 275. Tug "Anna W." and dumper "D. & I. No. 4."—Cahill Towing Line, owners of tug; Dalley & Ivins, owners of the dumper.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, p. 3555).

June 30, 1917. Case pending. (C. 452.)

No. 276. Tug "Anna W." and dumpers "S-33" and "S-34."—Cahill Towing Line, owners of tug; P. Sanford Ross (Inc.), owners of the dumpers.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, p. 3555).

June 30, 1917. Case pending. (C. 453.)

No. 277. Tug "O. L. Halenbeck" and dumpers "S-9" and "S-34."—Cahill Towing Line, owners of tug; P. Sanford Ross (Inc.), owners of the dumpers.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, p. 3555).

June 30, 1917. Case pending. (C. 457.)

No. 278. Tug "Bismarck" and dumper "S-20."—Cahill Towing Line, owners of tug; P. Sanford Ross (Inc.), owners of the dumper.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, pp. 3555 and 3556).

June 30, 1917. Case pending. (C. 458.)

No. 279. Tug "Cassie."—T. A. Scott Co., of New London, Conn., owners.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, p. 3556).

December 28, 1916. Plea of guilty entered. Fined \$250, without costs. Case closed. (C. 459.)

No. 280. Tug "Bismarck" and dumper "BB No. 19."—Cahill Towing Line, owners of tug; G. H. Breyman & Bros., owners of the dumper.

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1916 (pt. 3, p. 3556).

June 30, 1917. Case pending. (C. 460.)

(B) *Synopsis of cases referred to the United States attorneys during the fiscal year ending June 30, 1917.*

No. 281. Bradley Contracting Co.

United States engineer officer, first district, New York City, furnished this office with duplicate sets of blue prints showing considerable shoaling in the vicinity of the Bradley Contracting Co.'s dock in the East Channel, Blackwell's Island, East River, N. Y.; the inference being that the shoal was caused by the careless handling of material excavated from a section of the subway under construction in the process of loading and unloading scows at that point. The matter was investigated by this office, and all the papers in the case were referred to the United States attorney, New York City, for his action, on July 7, 1916.

July 9, 1917. United States attorney, New York City, in a communication to this office recommended that the matter be dropped because of insufficient evidence to warrant the beginning of criminal proceedings.

July 10, 1917. This office concurred in the recommendation above cited. Case closed. (C. 463.)

No. 282. Tug "May McGuirl," dumpers "O-20" and "O-23."—Owners of tug, Shamrock Towing Co., 680 Twelfth Avenue, New York City; owners of the dumpers, R. G. Packard Co., Bayonne, N. J.

Dumpers O-20 and O-23 had all pockets loaded with material dredged from the Baritan Copper Works at Perth Amboy, N. J., on November 29, 1916; and were towed to sea by the tug *May McGuirl* on the morning of November 30, and inspected while bound out at a point about 2 miles southeast of Scotland Lightship at about 5.30 a. m. of that date, when O-20 was found to have the forward middle pocket empty and O-23 the second forward and second after pockets empty, chains of both scows on above designated pockets all unwound.

It therefore seemed clear that the material loaded in the pockets referred to had been illegally deposited in the waters of the harbor, between the point of loading and the point of inspection last above stated.

January 22, 1917. All the papers in the case forwarded to the United States attorney, New York, for his action.

June 30, 1917. Case pending. (C. 502.)

No. 283. *Tug "Joshua Lovett" and dumper "S-6."*—Owners of tug, Taylor Dredging Co., foot Communipaw Avenue, Jersey City, N. J.; owners of dumper, P. Sanford Ross (Inc.), 277 Washington Street, Jersey City, N. J.

Dumper *S-6* was inspected while lying at the stake boat off Fifty-eighth Street, South Brooklyn, at 11 a. m., December 9, 1916, when it was found to have all pockets loaded with dredged material. This dumper was towed to sea by the tug *Joshua Lovett*, together with dumper *10-HH*, and was inspected while passing the Narrows bound out at about 11.25 p. m., December 9, when it was found to have two pockets fully loaded and the first forward and first after pockets about one-fourth loaded. The tow was again inspected while bound out at a point about 2½ miles southeast of Scotland Lightship at about 2.30 a. m., when dumper *S-6* was found to have all pockets entirely empty. It therefore seemed clear that the material loaded into all the pockets of dumper *S-6* had been illegally deposited in the waters of the harbor, between the stake boat at Fifty-eighth Street, South Brooklyn, and the point of inspection last above stated.

January 22, 1917. All the papers forwarded to the United States attorney, New York, for his action.

June 30, 1917. Case pending. (C. 503.)

No. 284. *Tug "Leonard Richards" and dumper "S-6."*—Owners of the tug, Peter Cahill, 140 Broad Street, New York City; owners of the dumper, P. Sanford Ross (Inc.), 277 Washington Street, Jersey City, N. J.

The tug *Leonard Richards* passed to sea with a tow on December 23, 1916, and was inspected while passing Cravens Shoal bound out about 8.45 p. m. of that date, when her tow was found to consist of dumpers *S-6* and *S-40*. *S-40* had the first forward pocket empty, first after pocket about one-half loaded, and the remaining four pockets fully loaded with dredged material. *S-6* had all pockets fully loaded. This tow was again inspected while bound out at a point about 1 mile north of Scotland Lightship at about 12.20 p. m., when dumper *S-6* was found to have all pockets entirely empty and the chains thereof unwound. The tow proceeded seaward and disposed of the contents of *S-40* at the designated dumping grounds, 3 miles southeast of Scotland Lightship. It therefore seemed clear that the entire contents of dumper *S-6* had been illegally deposited in the waters of the harbor, between Cravens Shoal and a point about 1 mile north of Scotland Light Vessel.

January 22, 1917. All the papers in the case forwarded to the United States attorney, New York, for his action.

June 30, 1917. Case pending. (C. 512.)

No. 285. *Tug "Gerry" and dumper "0-10."*—Owner of the tug, Peter Cahill, 140 Broad Street, New York City; owners of the dumper, R. G. Packard Co., Bayonne, N. J.

The tug *Gerry* passed to sea on the afternoon of December 27, 1916, and was inspected while passing the fort bound out about 1.15 p. m. of that date, when her tow was found to consist of dumpers *0-10* and *0-22*, each having all pockets fully loaded with mud. This tow was again inspected while bound out at a point about 1½ miles east by south of Scotland Lightship at about 4.45 p. m., when dumper *0-22* was found to have all pockets fully loaded and dumper *0-10* had the first and second after pockets empty. The tow proceeded seaward, reaching the designated dumping grounds 3 miles southeast of Scotland Lightship at about 5.15 p. m. of that date, where the remaining pockets in *0-10* and the entire contents of *0-22* were legally deposited. It therefore appears that the contents of two pockets of dumper *0-10* had been illegally deposited in the waters of the harbor, between the fort and a point about 1½ miles east by south of Scotland Lightship.

February 16, 1917. All the papers in the case forwarded to the United States attorney, New York City, for his action.

June 15, 1917. Libel of information filed against the tug and scow.

June 30, 1917. Case pending. (C. 514.)

No. 286. Tug "O. L. Halenbeck," dumpers "0-21" and "0-22."—Owner of the tug, Peter Cahill, 140 Broad Street, New York City; owners of the dumpers, R. G. Packard Co., Bayonne, N. J.

The tug *O. L. Halenbeck* passed the point of Sandy Hook bound out at about 130 a. m. of January 14, 1917, having in tow dumpers 0-21 and 0-22 loaded with mud. This tow apparently failed to reach the designated dumping ground 3 miles southeast of Scotland Lightship and was inspected while bound in at the entrance to Gedney Channel at about 3.15 a. m. of that date, when both dumpers were found to be entirely empty. It was evident from the lapse of time that this tow could not have reached the dumping ground and returned to the point where inspected bound in within the time stated, and that the entire contents of both dumpers were illegally deposited in the waters of the harbor.

February 17, 1917. All the papers in the case forwarded to the United States attorney, New York City, for his action.

June 30, 1917. Case pending. (C. 520.)

No. 287. Tug "Junjata" and dumper "S-11."—Owners of the tug, Forsyth Towing Line, 17 South Street, New York City; owners of the dumper, P. Sanford Ross (Inc.), 277 Washington Street, Jersey City, N. J.

The tug *Junjata* passed to sea on the morning of January 16, 1917, and was inspected while passing the Narrows bound out about 3.20 a. m. of that date, when her tow was found to consist of dumpers S-11 and S-40. S-11 had the first and second forward pockets about one-half loaded, all other pockets being fully loaded. S-40 had all pockets loaded. This tow was again inspected upon arriving at the dumping grounds 3 miles southeast of Scotland Lightship at about 8.35 a. m., when the first and second after pockets in dumper S-11 were found to be entirely empty and the chains slack. Failing to clear, the tow returned with the after middle pocket of S-11 fully loaded, chains wound up tight. While passing the Narrows bound in about 1.40 p. m., this tow was again inspected, when both dumpers were found to have all pockets entirely empty. It therefore appears that the contents of the first and second after pockets of S-11 had been illegally deposited in the waters of the harbor while the tow was bound out, and that the contents of the after middle pocket, which failed to clear at the dumping ground, had been illegally deposited in the waters of the harbor while bound in between that point and the Narrows.

February 16, 1917. All the papers in the case forwarded to the United States attorney, New York City, for his action.

June 15, 1917. Libel of information filed against the tug and scow.

June 30, 1917. Case pending. (C. 521.)

No. 288. Tug "O. L. Halenbeck" and dumper "S-34."—Owner of the tug, Peter Cahill, 140 Broad Street, New York City; owners of dumper, P. Sanford Ross (Inc.), 277 Washington Street, Jersey City, N. J.

The tug *O. L. Halenbeck* passed to sea on the afternoon of January 17, 1917, and was inspected while passing the Narrows, bound out, about 6.40 p. m. of that date, when her tow was found to consist of dumper S-34, with four pockets fully loaded with mud and two pockets empty. This tow arrived at the designed dumping ground about 10.15 p. m., at which point S-34 failed to clear and was inspected while passing the Lightship, bound in, at 11.55 p. m., when the second forward pocket was found to be fully loaded. The dumper was again inspected while the tow was passing the Narrows, bound in, at about 1.50 a. m., of the 18th, when it was found to have the second forward pocket about half loaded. Another inspection was made while the dumper was lying at the stake boat off Fifty-eighth Street, South Brooklyn, at about 8.30 a. m., January 18, 1917, when it was found to have all pockets entirely empty. It therefore seemed clear that the contents of the second forward pocket of this dumper had leaked out or had otherwise been illegally deposited in the waters of the harbor while returning from the dumping ground.

February 16, 1917. All the papers in the case forwarded to the United States attorney, New York City, for his action.

June 20, 1917. Libel of information filed against the tug and scow.

June 30, 1917. Case pending. (C. 522.)

No. 289. Tug "Junjata," dumpers "S-11" and "S-39."—Owners of the tug, Forsyth Towing Line, 17 South Street, New York City; owners of the dumpers, P. Sanford Ross (Inc.), 277 Washington Street, Jersey City, N. J.

The tug *Junjata* passed to sea on the afternoon of February 26, 1917, having in tow dumpers S-11 and S-39, and was inspected while passing Cravens Shoal,

bound out, about 1.25 p. m. of that date, when *S-11* was found to have the first forward pocket empty, first after pocket about one-fourth loaded, and four pockets fully loaded. *S-39* had the first forward pocket about one-fourth loaded and five pockets fully loaded. The tow proceeded seaward, but failing to reach the designated dumping ground, returned to the harbor and was inspected while bound in in the Inner Gedney Channel at about 4.45 p. m., when *S-11* was found to have the first and second forward and the first and second after pockets empty, chains unwound, and two middle pockets fully loaded. Dumper *S-39* had the first forward pocket about one-fourth loaded, forward middle and first after pockets empty, second forward, second after, and after middle pockets loaded. On account of the rough weather then prevailing this tow anchored in Sandy Hook Bay, at which point it was again inspected, when both dumpers were found to be in the same condition in regard to load as on inspection in the Gedney Channel. The tow left its anchorage at 8.45 a. m., February 27, and was inspected while passing the Narrows, bound in, about 11.35 a. m., of that date, when both dumpers were found to be entirely empty. It therefore seemed clear that the *Junata* and her tow failed to reach the designated dumping ground on either trip, and that the entire contents of both dumpers were illegally deposited in the waters of the harbor.

March 16, 1917. All the papers in the case forwarded to the United States attorney, New York City, for his action.

June 30, 1917. Case pending. (C. 530.)

No. 290. Tug "*O. L. Halenbeck*" and dumper "*D. & I. No. 1.*"—Owner of the tug, Peter Cahill, 140 Broad Street, New York City; owners of the dumper, Dailey & Ivins, 21 Park Row, New York City.

Dumper *D. & I. No. 1* had all pockets fully loaded with ashes and sweepings at the city dump at West Thirtieth Street, New York, February 14, 1917. This dumper was inspected by the master of the patrol vessel *Vigilant* while lying at the outer end of the pier at West Thirtieth Street about 1.40 p. m. of that date, when it was found to have all pockets fully loaded. It was again inspected while in tow of the tug *Halenbeck*, passing Robbins Reef Light, about 3.55 p. m. of that date, when the first forward pocket on the starboard side was found to be three-fourths loaded and the contents leaking. This dumper was again inspected while the tow was passing Cravens Shoal, bound out, about 4.35 p. m., when the first forward pocket on the starboard side was found to be entirely empty. It therefore seemed clear that the contents of the above designated pocket of this scow had leaked out or otherwise been illegally deposited in the channels of the harbor between West Thirtieth Street and Cravens Shoal.

March 21, 1917. All the papers in the case forwarded to the United States attorney, New York City, for his action.

June 15, 1917. Libel of information filed against the tug and scow.

June 30, 1917. Case pending. (C. 529.)

No. 291. *The Butterworth-Judson Corporation*.—An inspector of this office reported that the Butterworth-Judson Chemical Co. were depositing ashes, old lumber, and other floatable material into the tidal waters of the Passaic River at a point between high and low water mark, from their works on the west side of the Passaic River, south of the Central Railroad bridge. The matter was thoroughly investigated by this office and the United States district engineer officer, third district, New York City, and the conclusion reached that the Butterworth-Judson Corporation had been persistently violating the law in the manner stated.

May 10, 1917. All the papers and evidence in the case forwarded to the United States attorney, New Jersey, for his action.

June 12, 1917. Case presented to the grand jury at Newark, N. J.

June 30, 1917. Case pending. (C. 536.)

No. 292. Tug "*Columbia*" and dumper "*CD No. 28.*"—Owners of tug and dumper, Coastwise Dredging Co., 17 Battery Place, New York City.

The tug *Columbia* passed to sea on the afternoon of May 22, 1917, and was inspected while passing the Narrows bound out about 12.25 p. m. of that date, when her tow was found to consist of dumper *CD No. 28* with all pockets fully loaded with mud. The tow proceeded seaward, and upon reaching a point about three-fourths of a mile east southeast of Scotland Lightship the entire contents of the dumper were illegally deposited at that point about 5.20 p. m. of that date.

June 1, 1917. All the papers in the case forwarded to the United States attorney, New York City, for his action.

June 21, 1917. Libel of information filed against the tug and scow.

June 30, 1917. Case pending. (C. 539.)

No. 293. Tugs "*Kate Jones*" and "*Minot I. Wilcox*," dumpers "*BB 17*," "*BB 18*," and "*BB 19*."—Owners of the tugs and dumpers, G. H. Breymann & Bros., 17 Battery Place, New York City.

On May 29, 1917, dumper *BB No. 18* was inspected while lying at the stake boat off Fifty-third Street, South Brooklyn, and was found to have the second afterpocket about one-fourth loaded, all the other five pockets being fully loaded, all pockets leaking. This dumper was towed to sea by the tug *Minot I. Wilcox* and was inspected while passing the Narrows, bound out, about 3.15 p. m. of that date, when it was found to have four pockets fully loaded, second forward pocket about one-fourth loaded, and the first forward pocket about one-half loaded.

Dumper *BB No. 17* was inspected while at the stake boat, off Fifty-third Street, South Brooklyn, at 1.52 p. m. of May 29, 1917, when all pockets were found to be about three-fourths loaded, leaking. This dumper was towed to sea by the tug *Kate Jones* on the morning of May 30, 1917, and was inspected while passing the Narrows, bound out, about 4.10 a. m. of that date, when all pockets were found to be about two-thirds loaded.

Dumper *BB No. 19* was inspected while lying at the stake boat, off Fifty-third Street, South Brooklyn, at 1.52 p. m. of May 29, 1917, and was found to have five pockets fully loaded with dredged material and one pocket empty. This dumper was towed to sea by the tug *Kate Jones* and was inspected while passing the Narrows, bound out, at 4.10 a. m. of May 30, 1917, when it was found to have four pockets fully loaded, the second forward pocket empty, and the forward middle pocket about one-half loaded. This dumper was again inspected while the tow was passing the lightship, about 8.15 a. m., when it was found to have the second forward pocket empty and the remaining five pockets one-half loaded.

It therefore seemed clear that much of the contents of these dumpers had been illegally deposited into the tidal waters of the harbor through leakage.

June 14, 1917. All the papers referred to the United States attorney, New York City, attention being invited to the difficulties confronting this office attending the illegal deposit of material due to leakage from vessels while in transit to the dumping grounds, and that such violations of law are largely due to carelessness or want of proper precaution being adopted to prevent them, and that it was deemed of importance to the United States that prompt action should be taken with a view to the prosecution of the parties responsible.

June 30, 1917. Case pending. (C. 540.)

No. 294. Tug "*Susan A. Moran*" and dumper "*Cleary No. 1*."—Owners of the tug, Moran Towing & Transportation Co., 17 Battery Place, New York City; owners of the dumper, Cleary Bros., 17 South Street, New York City.

The tug *Susan A. Moran* passed to sea on the night of June 4, 1917, and was inspected while passing the Narrows, bound out, about 10.15 p. m. of that date, when her tow was found to consist of two dumpers, *Cleary No. 1* with the first forward pocket about one-fourth loaded, second forward pocket about one-half loaded, and the four remaining pockets fully loaded with mud. Dumper *P. C. B. Co. No. 1* had all pockets fully loaded with borate refuse. The tow proceeded seaward, reaching the designated dumping ground about 1.15 a. m. of June 5, at which point the entire contents of dumper *P. C. B. Co. No. 1* were legally deposited, while the contents of *Cleary No. 1* failed to clear and the tow returned to the harbor and was inspected while bound in, at 2 a. m., at a point about 3 miles southeast of Scotland Lightship, when dumper *Cleary No. 1* was found to have the first forward pocket about one-fourth loaded, second forward pocket about one-half loaded, and the remaining four pockets fully loaded, the chains on all pockets being wound up. The tow was again inspected off Cravens Shoal, bound in, about 5.25 a. m., when dumper *Cleary No. 1* was found to have all pockets entirely empty. It therefore seemed clear that the contents of this dumper had been illegally deposited in the waters of the harbor between the designated dumping ground and Cravens Shoal.

June 14, 1917. All the papers in the case referred to the United States attorney, New York City, for his action.

June 30, 1917. Case pending. (C. 541.)

No. 295. Tug "*Tasco*," dumpers "*9X*" and "*13X*."—Owners of the tug, Scully Line (Inc.), 1 Broadway, New York City; owners of the dumpers, William Beard & Co., 59 Pearl Street, New York City.

The tug *Tasco* passed to sea on the afternoon of June 8 and was inspected while passing the Narrows, bound out, about 11.15 p. m. of that date, when her tow was found to consist of two dumpers, Nos. 9X and 12X, each having all pockets fully loaded with mud. The tow proceeded seaward, failed to reach the designated dumping ground, and was inspected while passing the Upper Buoy of the Middle Ground, bound in, about 2.35 a. m. of June 9, 1917, when all pockets of both dumpers were found to be entirely empty, chains all unwound. It therefore seemed clear that the entire contents of these dumpers had been illegally deposited in the waters of the harbor.

June 15, 1917. All the papers in the case forwarded to the United States attorney, New York City, for his action, attention being invited to the fact that from the statements of the master of the *Tasco* it appeared that the illegal dumping took place directly in the Swash Channel, and that such was considered as an aggravated case. Recommendation was therefore made that an effort be made to obtain a heavier penalty than the customary fine of \$250.

June 30, 1917. Case pending. (C. 542.)

No. 296. *British steamship "Hannington Court."*—Compagnie Generale Transatlantique, agent, 19 State Street, New York City.

The master of the patrol vessel *Vigilant* saw the British steamship *Hannington Court* anchored below Bedloes Island at about 1.45 p. m. June 18, 1917, and the crew engaged in throwing overboard a large quantity of dunnage and waste timbers very dangerous to navigation. He boarded the steamship and interviewed the second mate, Mr. A. Taylor, who was on deck at the time and who disclaimed any knowledge as to the waste material being thrown overboard.

June 19, 1917. All the papers in the case were referred to the United States attorney, New York City, for his action, with the following note:

"* * * That foreign vessels entering and leaving the harbor of the empire city of the country should violate the Federal laws with impunity seems to indicate that drastic action is necessary to put a stop to the practice * * *."

June 20, 1917. Receipt of papers acknowledged by the United States attorney, with request that patrol vessels keep a sharp lookout and advise him of the return of the steamship *Hannington Court* to this port.

June 21, 1917. Masters of patrol vessels instructed accordingly.

June 30, 1917. Case pending. (C. 548.)

No. 297. *Tug "Bouker No. 2" and dumper "79-H."*—Owners of the tug and dumper, Bouker Contracting Co., 17 State Street, New York City.

The tug *Bouker No. 2* passed to sea on the morning of June 9, 1917, and was inspected while passing the fort bound out about 2 a. m. of that date, when her tow was found to consist of dumpers *Mulligan No. 2* and *79-H*, both dumpers having all pockets loaded with cellar dirt. The tow proceeded to sea, reaching the designated dumping ground, at which point the contents of dumper *Mulligan No. 2* were legally deposited. The first forward pocket of dumper *79-H* failed to clear and was found to be fully loaded and the chains partly wound up when the tow returned to the harbor about 6.50 a. m. This tow was inspected while passing Cravens Shoal bound in at about 9.45 a. m. when dumper *79-H* was found to be entirely empty. It therefore seemed clear that the contents of the first forward pocket of dumper *79-H* had been illegally deposited in the waters of the harbor, between the designated dumping ground and the point of inspection last above stated.

June 21, 1917. All the papers in the case referred to the United States attorney, New York City, for his action.

June 30, 1917. Case pending. (C. 543.)

No. 298. *Tug "William H. Taylor," dumpers "43-M," "45-M," and 50-M."*—Owners of the tug and dumpers, Morris & Cumings Dredging Co., 17 State Street, New York City.

The tug *William H. Taylor* passed to sea on the morning of June 13, 1917, and was inspected while passing the fort bound out about 6 a. m. of that date, when her tow was found to consist of three dumpers, Nos. *43-M*, *45-M*, and *50-M*, each dumper having all pockets fully loaded with mud. The tow proceeded seaward, and upon reaching a point about one-fourth of a mile northeast of Scotland Lightship, at about 10 a. m. of that date, the entire contents of the three dumpers were illegally deposited at that point in 10½ fathoms of water.

June 21, 1917. All the papers in the case referred to the United States attorney, New York City, for his action.

June 21, 1917. Commandant, navy yard, New York, advised of the facts for such action as he may deem proper in regard to payment for material not dis-

posed of in accordance with law and contract, as the material loaded into these dumpers had been dredged at the navy yard under Government contract.

June 27, 1917. Public works officer, navy yard, New York, forwarded to this office copy of letter advising Morris & Cumings Dredging Co. that in accordance with the terms of their contract 2,607.25 cubic yards would be deducted from the total amount dredged on the June voucher.

June 30, 1917. Case pending. (C. 544.)

No. 299. Tug "*Kate Jones*" and dumper "*BB No. 19.*"—Owners of the tug and dumper, G. H. Breymann & Bros., 17 Battery Place, New York City.

The tugs *Kate Jones* and *Minot I. Wilcox* passed to sea on the afternoon of June 16, 1917; these tugs had three dumpers in tow and were inspected while passing the Narrows bound out at about 8.05 p. m. of that date, when the tow was found to consist of dumpers *BB Nos. 15, 16, and 19.* *Nos. 15 and 16* had all pockets loaded with mud and clay, while *No. 19* had four pockets loaded, the second forward and second after pockets being empty. The tow proceeded seaward, and at some point below the Narrows separated, the *Kate Jones* proceeding with *Nos. 15 and 19*, while the *Minot I. Wilcox* proceeded with *No. 16.* The tow of the *Kate Jones* was inspected while bound out at a point about 2½ miles southeast of Scotland Lightship about 12.35 a. m. of June 17, at which point dumper *BB No. 19* was found to be entirely empty, while *BB No. 15* had all pockets loaded. The tow continued seaward and arrived at the designated dumping ground at 12.50 a. m., at which point the contents of *BB No. 15* were legally deposited. It therefore seemed clear that the material comprising the load of dumper *BB No. 19* had been illegally deposited in the waters of the harbor, between the Narrows and Scotland Lightship.

June 27, 1917. All the papers in the case referred to the United States attorney, New York City, for his action.

June 30, 1917. Case pending. (C. 545.)

No. 300. Tugs "*Kate Jones*" and "*Minot I. Wilcox,*" dumpers "*BB No. 15*" and "*BB No. 16.*"—Owners of the tugs and dumpers, G. H. Breymann & Bros., 17 Battery Place, New York City.

Dumpers *BB No. 15* and *BB No. 16* were found to have all pockets fully loaded with dredged material when inspected by Deputy Inspector John J. O'Mara, of this office, at the docks of the Texas Oil Co., Bayonne, N. J., at 4.30 p. m. of June 13, 1917. Tugs *Kate Jones* and *Minot I. Wilcox,* with one dumper each, made fast to the stake boat in Gravesend Bay at about 7 p. m. of that date.

The master of the patrol vessel *Nimrod* reported that John R. Belford and Thomas Boyle, of Bay Forty-seventh Street, Ulmer Park, Brooklyn, reported to him that upon drawing their lobster pots, which were planted in the vicinity of the stake boat in Gravesend Bay, they were found to be covered with red clay. Upon investigation John Hansen and Nells Gustavsen, in charge of the Morris & Cumings stake boat in Gravesend Bay, stated that they heard pawls of dumper pockets being knocked out about 2 a. m. of June 14, 1917, and at 5 a. m. of that date saw the two dumpers empty.

The records of this office do not show that either of these tugs passed to sea between 4.30 p. m. of the 13th and 5 a. m. of the 14th of June, 1917. It was, therefore, evident that the tows never went near the dumping ground, and the material was illegally deposited in the waters of the harbor at the stake boat in Gravesend Bay.

June 27, 1917. All the papers in the case and evidence forwarded to the United States attorney, New York City, inviting special attention to the deliberate and flagrant violation of law, and in view of the aggravated nature of the case, requesting that efforts be made to enforce the full amount of penalties that can possibly be obtained. It was also recommended that criminal action should be taken against the masters of the towing vessels, with a view of having at least their licenses suspended. Favorable consideration was also invited to the fact that the first information which was likely to lead to conviction was obtained from the two lobster fishermen and the two men in charge of the stake boat.

June 30, 1917. Case pending. (C. 547.)

No. 301. Tug "*Imperial,*" dumpers "*S-11*" and "*S-33.*"—Owners of the tug, Peter Cahill, 140 Broad Street, New York City; owners of the dumpers, P. Sanford Ross (Inc.), 277 Washington Street., Jersey City, N. J.

The tug *Imperial* passed to sea on the night of June 14, 1917, and was inspected while passing the Narrows, bound out, about 9 p. m. of that date, when her tow was found to consist of two dumpers, *Nos. S-11 and S-33.* *S-11*

was found to have four pockets fully loaded with mud, while the first forward and first after pockets were about one-fourth loaded. *S-33* had three pockets fully loaded with mud, the first forward, after middle, and second after pockets being about one-fourth loaded; all chains on partly loaded pockets were wound up. The tow proceeded seaward, and was inspected while bound out through the Gedney Channel about 11 p. m., when the loads in the above-designated dumpers were found to be as follows: *S-11*, first forward, second forward, first after pockets empty, all other pockets loaded. *S-33* had the after middle pocket empty and all other pockets more or less loaded. It therefore seemed clear that the material in the second forward pocket of *S-11* had been illegally deposited in the waters of the harbor and that considerable of the material in the other pockets of the dumpers comprising this tow had been illegally deposited in the waters of the harbor through leakage while in transit.

June 30, 1917. All the papers in the case forwarded to the United States attorney, New York City, for his action, with the following memorandum: "As this office has been making every endeavor to force owners of dumpers to take action that would prevent leakage in transit, with only partial success, the papers are submitted for your consideration and such action as you may deem advisable."

June 30, 1917. Case pending. (C. 546.)

No. 302. Tug "*Princess*" and dumper "*S-34*."—Owners of the tug, Peter Cahill, 140 Broad Street, New York City; owners of the dumper, P. Sanford Ross (Inc.), 277 Washington Street, Jersey City, N. J.

The tug *Princess* passed to sea on the afternoon of June 20, 1917, and was inspected while passing the Narrows, bound out, about 12.10 p. m. of that date, when her tow was found to comprise dumper *S-34*, loaded with mud. The tow proceeded seaward, and was inspected while bound out at a point about 1½ miles southeast by east of Scotland Lightship at about 4.45 p. m., when dumper *S-34* was found to have all pockets entirely empty. It therefore seemed clear that the entire contents of dumper *S-34* had been illegally deposited in the waters of the harbor between the Narrows and the point of inspection last above stated.

June 30, 1917. All the papers in the case forwarded to the United States attorney, New York City, for his action.

June 30, 1917. Department of docks and ferries, New York City, advised by this office of the facts in the case for such action as may be deemed proper in regard to payment for material not disposed of in accordance with law and contract.

July 5, 1917. Department of docks and ferries advised this office that 774 cubic yards had been deducted from the amount due the contractor.

June 30, 1917. Case pending. (C. 549.)

10. APPROPRIATIONS.

Dates and amounts of appropriations for prevention of deposits, harbor of New York.

June 29, 1888	\$30,000	Mar. 3, 1903	\$120,260
Mar. 2, 1889	94,070	Apr. 28, 1904	73,260
Aug. 30, 1890	33,000	Mar. 3, 1905	85,260
Mar. 3, 1891	33,000	June 30, 1906	80,260
Aug. 5, 1892	33,000	Mar. 4, 1907	90,260
Mar. 10, 1893	31,000	May 27, 1908	85,260
Apr. 24, 1893 (deficiency)	2,000	Mar. 4, 1909	85,260
Aug. 18, 1894	76,000	June 25, 1910	100,260
Mar. 2, 1895	96,000	Mar. 4, 1911	85,260
June 11, 1896	59,000	Aug. 24, 1912	85,260
June 4, 1897	59,000	June 23, 1913	85,260
July 1, 1898	59,000	Oct. 22, 1913 (deficiency)	5,000
Mar. 3, 1899	110,500	Aug. 1, 1914	94,260
June 6, 1900	76,100	Mar. 3, 1915	85,260
Mar. 3, 1901	72,800	July 1, 1916	160,260
June 28, 1902	70,260	June 12, 1917	96,760
Mar. 3, 1903 (deficiency)	10,000		

RECLAMATION AND DEVELOPMENT OF ANACOSTIA RIVER AND
FLATS, FROM ANACOSTIA BRIDGE NORTHEAST TO THE DISTRICT
LINE, D. C.

REPORT OF COL. W. L. FISK, UNITED STATES ARMY, RETIRED.

Dredging under contract with Maryland Dredging & Contracting Co., dated January 3, 1916, was begun on September 27, 1916, and was completed on January 5, 1917. The 16-inch hydraulic dredge *Potomac* was engaged on the work continuously, day and night, except for delays incidental to this class of work. The *Potomac* was in operation 77 days—1,273½ hours—and excavated 350,237 cubic yards of material within the limits specified in the contract and 40,867 cubic yards of material outside of said limits. Two small wrecks were also removed from the dredged channel under provision of the contract. The average daily output was 4,548.5 cubic yards, and the average hourly output was 275 cubic yards. The excavated material, consisting of about 95 per cent mud, 4 per cent sand, and 1 per cent gravel, was deposited through discharge pipes upon sections D and E of Anacostia Flats, and this area was raised by the deposit to the average height of about 7 feet above mean low water. Resulting from the dredging, the channel was excavated to a depth of 17 feet and was completed between the Anacostia Bridge and a point 2,400 feet above. The cost per cubic yard, as named in the contract, was 5½ cents, and including the inspection, office, and incidental expenses was about 6 cents, the total expenditure on the work being \$21,021.07.

Dredging by the U. S. dredge *Dalecarlia*, which was in progress at the end of the prior fiscal year, was continued until August 22, 1916, when the dredge was removed from the work and was assigned to dredging in Occoquan Creek, Va. Dredging in Occoquan Creek was suspended for the winter on December 15, and during the winter period, December 16 to February 26, the dredge was thoroughly overhauled and repaired. The cost of overhauling, renewals, and repairs was \$5,717.96. The *Dalecarlia* was towed to the Anacostia River on February 27, placed in position and resumed dredging on March 1, 1917, continuing operations until it was withdrawn from the work on May 10 for dredging in Aquia Creek, Va. During the periods it was in operation on a 12-hour-per-day basis for 98 days, making 893½ pumping hours, and excavated 226,052 cubic yards of material at the average hourly rate of 253 cubic yards. The excavated material, consisting of 85 per cent mud, 10 per cent sand, and 5 per cent clay and gravel, was deposited through discharge pipes on the flats between the left bulkhead line and the main shore and between Pennsylvania Avenue Bridge and Pennsylvania Railroad Bridge, which were raised about 3 feet by the deposit. The dredging was carried to an average of 15 feet below mean low water, and about 80 per cent

of the river area between the said bridges was dredged. The cost of the work, including inspection and incidentals, was \$9,061.46, making the unit costs 4.008 cents and 6.538 cents including the cost of overhauling, renewals, and repairs.

Dredging under a public-notice order, with Dorsey & Miller Co., was begun on December 11, 1916, was suspended from February 4 to 20, 1917, on account of ice, and was completed on March 22, 1917. During the periods the dredge was in operation 472 $\frac{1}{2}$ hours and dredged 42,092 cubic yards of material, over an area of 177,215 square feet. The dredged material was placed in dump scows, towed to Hawes Run sewer, and dumped in the river in that vicinity, where it was rehandled and pumped ashore by the U. S. pipe-line dredge *Dalecarlia*. The resulting depths over the area were from 16 to 17 feet at mean low water. The cost per cubic yard, as named in the order, was 9 $\frac{1}{2}$ cents, and including the inspection, office, and incidental expenses was about 10 cents, making the total cost \$4,368.41.

The purchase of the 18-inch hydraulic dredge *Captain Andrew Talcott*, at \$60,000, was authorized on April 13, subject to a satisfactory three months' service run. The *Talcott* arrived on the works on May 21, and, after the necessary renewals and repairs were completed, began its service run on June 19. By June 30 only 16,132 cubic yards had been excavated. Most of the run to date was consumed in making adjustments to machinery and breaking in the crew to working it. The expenditure on this account was \$1,374.13.

Trench and embankment work for sea-wall foundations was prosecuted throughout the year by contractor's plant and U. S. derrick boat *Atlas*, viz: (1) Work by the Dorsey & Miller Co., under lease dated June 5, 1916, which was in progress last fiscal year, was continued between July 8 and 24, between October 2 and December 6, and between March 27 and April 12, at the unit cost of \$4.15 per hour's work. Clamshell dredge *Daniel* was employed, and during these periods it was in operation 654 $\frac{1}{2}$ hours, and excavated and banked 41,688 cubic yards of mud on 12,822 linear feet of embankment; (2) the work by U. S. derrick boat *Atlas* was prosecuted between July 26 and September 15 and between April 14 and June 30 (when it was still in progress). During these periods the *Atlas* was in operation 434 hours, excavated and banked 57,539 cubic yards of mud on 13,591 linear feet of embankment, and removed eight old piles from the river. The expenditure for trench and embankment work for this fiscal year was \$5,933.74, making the unit cost of 6 cents per cubic yard of material removed. Resulting from the work, trench and embankments were completed as far up as the Pennsylvania Railroad bridge, and about 50 per cent completed along the navigation channel between the Pennsylvania Railroad bridge and Benning Road. The work is equivalent to 6,742 linear feet of completed embankment.

About 1 mile of levee was thrown up with shovels by a hired force for retaining the dredged spoils from the U. S. dredges *Dalecarlia* and *Talcott*. The necessary siphons and waste weirs for running off the water pumped by the dredges were constructed and maintained. The cost of levees, siphons, and waste weirs was \$4,075.65.

The work on riprap sea-wall foundations was continued throughout the year under a contract with the Columbia Granite & Dredging

Company; 31,563.5 cubic yards of riprap were delivered and placed. Resulting from the work, the foundations were restored where settlement had taken place, and were extended above the Pennsylvania Railroad bridge about a mile. The scarcity of labor and unsettled conditions incident to the war have caused much delay on the work. The contract price for riprap in place was \$1.74 per cubic yard. The cost of the work, including inspection, superintendence, and incidentals, was \$58,424.15. Two slides occurred in the riprap sea-wall foundations, one in the vicinity of Hawes Run sewer, the other in the vicinity of Burnt Bridge Run sewer. These failures were repaired by driving piles on 3-foot centers and 10 feet in front of the line from 324 feet above to 150 feet below Hawes Run sewer, and from 50 feet above to 150 feet below the Burnt Bridge Run sewer. The piles were driven to 1 foot below mean low water, and additional riprap was placed on the alignment, the piles serving to prevent further sliding of the riprap. Three hundred and eighty-eight piles were used, of which 108 were driven by the U. S. snag boat *York* during October and 280 were driven by Clarke & Winston under a public-notice order during December. The cost of piles, driving, inspection, and incidentals was \$1,466.01.

Work on the 1,065 linear feet of pile grillage sea-wall foundation on the right bulkhead line, in the vicinity of Pennsylvania Avenue Bridge, which was in progress at the beginning of the year, was completed in September; 113 batter piles were driven and secured; 415 linear feet of wale pieces, capping, and flooring were placed, and the concrete base was poured. The U. S. snag boat *York* and U. S. derrick boat *Atlas*, with a hired force, did the work. The expenditure on this work was \$2,789.11.

Work of constructing masonry sea wall in progress at beginning of year was suspended on July 12, the force and plant being assigned to similar work at the western limits of Potomac Park; was resumed on September 14; was suspended for the winter on November 16; was resumed in the spring on April 15, and suspended on May 15 on account of the scarcity of labor and materials due to the war. An average force of 9 masons and 16 laborers was employed except during April and May, when only 2 masons and 7 laborers accustomed to this work could be procured. Some Government plant was also employed on the work. Resulting from the work of these periods 1,674 linear feet of masonry sea wall were constructed, of which 909 linear feet were built between Pennsylvania Avenue and Massachusetts Avenue. The sea wall on both sides of the river is now completed as far up as Pennsylvania Avenue, with the exception of 350 feet in front of Deans Boat Yard near the foot of Thirteenth Street SE. Since May 15 a foreman and the small force of laborers employed have molded 827 blocks. The expenditure on masonry sea wall and molding of concrete blocks, including plant, materials, labor, inspection, and incidentals, was \$10,686.10.

The following floating plant was constructed:

(1) Motor launch *Averill*, built under contract with the Chance Marine Construction Co., of Annapolis, Md., was delivered complete in Washington, D. C., in January. The cost, including inspection, superintendence, and incidentals, was \$4,820.64.

(2) Forty-six pontoons were constructed by hired labor, 16 for hydraulic dredge *Dalecarlia* and 30 for hydraulic dredge *Talcott*,

between November 1, 1916, and May 31, 1917. The cost of materials, labor, and incidentals was \$5,266.88.

(3) The hull and house of motor launch *Relee* were rebuilt by hired labor at a cost of \$711.47.

(4) The construction of scows 9 and 10 was begun on June 11, 1917, and was in progress at the close of the fiscal year, 5 per cent having been completed. The work is being done by hired labor. The expenditure on this account to the close of the fiscal year was \$816.92.

Negotiations were in progress for acquiring the land necessary for the project. The act of Congress (District bill) of March 3, 1917, authorized the acquisition of land between East Capitol Street and the District line by purchase or condemnation, and of land in vicinity of Pennsylvania Avenue, now owned by the railroad company, by an adjustment of boundaries, rights, etc. About three-fourths of an acre was acquired. The expenditure on this account was \$4,431.83.

Surveys, incidental to purchase of land and the layout of the different works, were made throughout the year.

In addition to the above-mentioned sums the following expenditures were made: For the use and maintenance of the U. S. tug *Castle*, \$1,541.14; for the use, maintenance of, and repairs to other floating plant, and for the care of Government property, \$3,270.72; and for engineering, surveys, clerical, maintenance of office, and miscellaneous expenses, \$10,239.45, making in all an expenditure of \$156,017.64 during the fiscal year.

It is estimated that the project is now 22 per cent completed.

The principal items of work are summarized as follows:

	Work done.		
	Prior to fiscal year 1917.	During fiscal year 1917.	Total to June 30, 1917.
Excavation and deposit made on flats..... cubic yards..	1,143,024	788,177	1,931,201
Sea-wall foundations, riprap placed..... do.....	96,703.6	31,563.5	130,267.1
Sea-wall foundation, grillage..... linear feet..	1,065	* 415	1,065
Embankment built..... do.....	12,600	6,742	19,342
Masonry sea wall..... do.....	7,702	1,674	9,376
Piles driven..... do.....	1,131	501	1,632
Old piles drawn and removed from river.....	749	8	757
Land purchased.....	\$73,123.54	\$4,131.83	\$77,555.37
Construction or purchase of floating plant.....	\$30,628.68	\$12,990.04	\$43,618.72
Total expenditure.....	\$425,766.17	\$156,017.64	\$581,783.81

¹ 70 per cent completed.

² 60 per cent completed.

APPROPRIATIONS.

Mar. 2, 1911.....	\$100,000
June 26, 1912.....	100,000
Mar. 4, 1913.....	100,000
July 21, 1914.....	100,000
Mar. 3, 1915.....	100,000
Sept. 1, 1916.....	200,000
Mar. 3, 1917.....	300,000
Total.....	1,000,000

CONTRACTS IN FORCE.

DREDGING.

Contractor: Maryland Dredging & Contracting Co., Baltimore, Md.

Date of contract: January 3, 1916.

Date of approval: January 3, 1916.

Date fixed for commencement: February 11, 1916, extended to March 16, 1916.

Rate required: 50,000 cubic yards per month for each machine employed during first month; 80,000 cubic yards per month for each machine employed during the succeeding months to completion.

Amount of contract: 300,000 cubic yards.

Unit price: 5½ cents per cubic yard.

Completed at end of fiscal year.

RIPRAP AND BUILDING STONE.

Contractor: Columbia Granite & Dredging Co., Washington, D. C.

Date of contract: June 6, 1916.

Date of approval: June 16, 1916.

Date fixed for commencement: July 21, 1916.

Rate required: Riprap, 4,000 cubic yards per month; building stone, 400 cubic yards per month.

Amount of contract: Riprap, 50,000 cubic yards, 40 per cent \pm ; building stone, 4,000 cubic yards, 40 per cent \pm .

Unit price: Riprap, \$1.74 per cubic yard; building stone, \$2.25 per cubic yard.

Completed at end of fiscal year: 75 per cent.

MOTOR LAUNCH AVERILL.

Contractor: Chance Marine Construction Co., Annapolis, Md.

Date of contract: July 14, 1916.

Date of approval: August 16, 1916.

Date fixed for commencement: September 1, 1916.

Date fixed for completion: November 10, 1916.

Amount of contract: \$2,472.

Completed at end of fiscal year.

WASHINGTON AQUEDUCT, DISTRICT OF COLUMBIA.

REPORT OF COL. W. L. FISK, UNITED STATES ARMY, RETIRED.

Operations were carried on during the fiscal year under the following appropriations, approved September 1, 1916, and April 17, 1917.

1. Maintenance and operation of the Washington Aqueduct and its accessories.
2. Emergency fund.
3. Continuation of parking grounds of McMillan Park.
4. Ordinary repairs, etc., Conduit Road.

1. MAINTENANCE AND OPERATION.

The work of maintenance includes the dam at Great Falls, about 2,800 feet in length; the conduit and tunnels, aggregating 16 miles in length; 3 sedimentation reservoirs, each about 42 acres in area; about 900 acres of land; 14 miles of road; 4 bridges; fences; 3 pumping stations; 43 gatehouses, dwellings, and other buildings; 1 coagulating plant; 29 one-acre filters; 1 filtered-water reservoir; 29 sand bins; 1 pumping station for pumping the entire water supply to the filters; telephone line; 3 motor trucks; and 63 water meters on Federal services.

The amount of money expended on each of the above works, including outstanding liabilities, was as follows:

Conduit, tunnels, and flume.....	\$269.52	Filter operations.....	\$14,505.68
Reservoirs.....	482.14	Telephone line.....	359.84
Buildings and grounds....	17,837.78	Sewer.....	1,726.70
Roads.....	2,268.58	Watching and guarding property.....	10,088.47
Bridges.....	6.52	Maintenance of meters....	345.21
Fences.....	3,395.39	Motor vehicles.....	4,334.28
Pumping stations and machinery.....	49,551.58	Clerical and engineering....	16,135.09
Preliminary treatment....	11,743.12	Total.....	133,000.00

The nature of the above work was such that it is impracticable to give unit costs which would be comparable with those in other districts, and they have therefore been omitted.

The purification plant was continuously in operation throughout the year, and the results, amount of work, and cost, including the same for previous years, for comparison, are summarized in the following tables:

TABLE 1.—Consumption (in million gallons) of water per 24 hours.

(A) MAXIMUM.

Month.	Fiscal years.							
	1910	1911	1912	1913	1914	1915	1916	1917
July.....	76.16	78.32	75.78	74.42	73.68	72.96	62.11	65.47
August.....	69.31	74.25	73.64	72.08	69.95	66.78	62.34	64.04
September.....	66.02	70.33	65.75	71.66	70.48	65.72	59.61	66.10
October.....	71.26	70.52	66.47	66.14	63.44	68.10	62.00	59.88
November.....	64.92	63.62	67.73	57.02	60.96	57.11	58.39	58.30
December.....	67.83	70.76	62.16	58.99	56.58	67.96	56.11	59.08
January.....	70.04	68.20	92.72	59.19	62.31	56.91	57.80	61.56
February.....	70.79	64.21	80.20	57.84	67.75	55.52	57.74	68.53
March.....	59.11	58.83	76.71	58.19	70.93	63.67	58.04	58.85
April.....	66.63	67.63	68.39	63.89	59.31	58.33	55.70	56.37
May.....	61.98	74.32	71.55	64.44	63.54	63.37	60.67	60.59
June.....	70.49	74.41	69.88	68.34	69.69	65.38	58.14	63.36

(B) MINIMUM.

July.....	58.52	56.67	53.70	54.83	56.78	50.49	48.49	47.66
August.....	54.44	54.79	56.25	57.81	53.72	52.28	47.10	50.05
September.....	52.82	54.82	51.46	55.53	52.65	50.99	43.51	48.17
October.....	52.33	54.44	52.21	54.24	44.76	51.74	46.66	44.24
November.....	50.86	49.82	51.59	49.18	47.44	44.78	44.24	41.98
December.....	48.32	53.03	48.60	48.55	45.08	46.98	37.95	43.19
January.....	57.02	55.17	49.39	45.40	45.94	45.51	38.62	41.50
February.....	55.19	52.22	55.80	48.99	45.77	44.77	41.12	44.94
March.....	51.64	49.57	49.88	46.90	48.39	42.37	42.78	39.08
April.....	53.79	50.37	50.86	49.75	47.38	45.86	43.84	48.49
May.....	54.55	54.53	56.06	51.22	50.82	46.23	44.23	44.05
June.....	50.42	55.31	55.20	52.11	61.48	48.08	44.50	45.10

(C) AVERAGE.

July.....	64.46	64.22	66.17	64.84	63.64	58.83	55.93	56.78
August.....	61.42	62.82	63.82	64.78	60.15	59.53	55.46	57.83
September.....	60.32	62.59	60.64	63.01	59.23	58.49	55.04	57.07
October.....	59.18	61.05	59.23	58.67	55.60	56.31	64.48	51.59
November.....	55.25	57.91	56.25	54.51	53.02	52.84	49.78	50.95
December.....	56.77	62.77	58.59	53.64	50.42	54.43	48.41	50.74
January.....	62.49	60.67	71.65	51.57	53.17	52.10	49.31	51.92
February.....	60.23	57.18	70.98	52.36	56.60	50.23	49.46	54.25
March.....	56.04	53.99	60.32	52.59	56.78	48.71	49.49	49.90
April.....	58.32	55.76	57.91	55.14	51.13	51.20	50.14	50.40
May.....	57.76	68.04	61.25	57.82	57.10	53.88	52.67	58.00
June.....	58.37	62.13	61.63	60.24	60.40	55.53	52.61	60.08
Average.....	59.19	60.35	61.95	57.44	56.43	54.54	51.91	53.81
Population.....	345,003	348,460	354,019	352,936	353,297	353,664	357,749	359,987
Daily per capita consumption, gallons..	173	173	175	162	160	154	145	149

TABLE 2.—Consumption of water in Government buildings.

Location.	Average daily consumption in gallons for the fiscal year—				
	1913	1914	1915	1916	1917
Municipal building.....	73,500	74,900	67,700	83,800	54,100
Government Printing Office.....	1,738,000	1,750,800	3,382,000	2,585,000	2,927,400
Navy yard.....	1,050,200	738,800	1,874,000	1,880,000	1,068,000
Soldiers' Home.....		324,000	428,000	379,000	306,300
Walter Reed Hospital.....		37,100	50,000	33,500	30,600
Marine Barracks.....		59,500	95,300	78,400	70,500
Zoological Park.....		217,900	294,000	314,000	399,800
Howard University.....		26,700	28,200	26,800	25,800
Freedmen's Hospital.....		46,900	59,400	61,000	63,900
Washington Aqueduct.....			27,900	84,900	99,800
Naval Hospital and Medical School.....			99,600	66,400	70,900
Hygienic Laboratory.....			15,400	18,700	22,200
Library of Congress.....			112,000	149,000	143,000
National Museum.....			57,200	46,800	35,700
Bureau Engraving and Printing.....				826,000	1,041,000
Agricultural Department.....				468,000	600,100

¹ Probably too small, as meter was too large to measure night flow.

TABLE 3.—Turbidity.

(A) MAXIMUM.

Fiscal year.	Great Falls.	Dalecarlia Reservoir outlet.	Georgetown Reservoir outlet.	McMillan Park Reservoir outlet.	Filtered water reservoir.
1906-7.....	1,530	250	150	250	13
1907-8.....	3,000	340	250	160	20
1908-9.....	1,500	200	170	85	8
1909-10.....	2,100	200	215	120	9
1910-11.....	1,500	120	70	40	1
1911-12.....	3,000	700	70	40	4
1912-13.....	3,000	750		95	1+
1913-14.....	3,000	400	85	37	0+
1914-15.....	8,000	700	65	18	0+
1915-16.....	3,000	600	110	56	0.5
1916-17.....	4,000	800	80	28	1

(B) MINIMUM.

1906-7.....	9	7	8	6	0.4
1907-8.....	7	7	8	6	0
1908-9.....	7	7	6	5	0
1909-10.....	7	7	7	2	0
1910-11.....	7	7	7	1	0
1911-12.....	7	7	7	3	0
1912-13.....	6	7		2	0
1913-14.....	7	7	3	1	0
1914-15.....	6	7	7	2	0
1915-16.....	7	7	7	2	0
1916-17.....	7	6	7	2	0

(C) AVERAGE.

1906-7.....	114	46	37	29	2
1907-8.....	117	53	45	31	2
1908-9.....	79	50	32	22	1
1909-10.....	86	30	29	18	1
1910-11.....	41	18	16	10	0
1911-12.....	208	59	23	13	0
1912-13.....	159	51		15	0
1913-14.....	150	37	19	11	0
1914-15.....	190	46	15	8	0
1915-16.....	238	50	24	10	0
1916-17.....	247	54	18	10	0

TABLE 4.—*Suspended matter entering system, etc.*

Fiscal year.	Amount that would have entered the system if the gates had been left continuously open.	Hours gates were closed.	Amount shut out.	Amount deposited in Dalecarlia Reservoir.	Amount deposited in Georgetown Reservoir.	Amount deposited in McMillan Park Reservoir.	Amount entering filtration plant.	Total.
	<i>Tons.</i>		<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>	<i>Tons.</i>
1906-6.....	7,177	228.0	3,264	1,849	657	424	963	7,177
1906-7.....	8,487	451.0	3,571	2,631	411	364	1,432	8,489
1907-8.....	9,696	463.0	3,684	2,511	1,238	721	1,406	9,656
1908-9.....	6,092	669.0	1,890	1,198	1,348	833	814	6,088
1909-10.....	6,522	920.0	2,613	2,123	515	611	661	6,522
1910-11.....	3,102	986.5	1,403	713	282	356	346	3,102
1911-12.....	16,979	1,857.5	5,142	8,005	1,353	1,392	487	16,979
1912-13.....	12,873	1,455.75	3,772	6,277	(¹)	2,806	531	12,873
1913-14.....	11,251	1,775.9	4,950	4,337	1,014	688	367	11,251
1914-15.....	14,697	1,999.0	3,165	9,229	1,557	279	767	14,697
1915-16.....	19,815	3,058.0	6,643	10,470	1,260	553	890	19,815
1916-17.....	22,338	1,083.0	9,276	10,414	1,730	368	550	22,338

¹ Out of service.² Put into service Aug. 21, 1913.TABLE 5.—*Preliminary treatment.*

Fiscal year.	Total number days used.	Total amount of hydrated lime used.		Total amount of alum used.		Cost per million gallons filtered.				
		Tons.	Pounds.	Long tons.	Pounds.	Labor.	Alum.	Lime.	Supplies.	Total.
1911-12.....	110			534	1,079	\$0.05	\$0.48			\$0.53
1912-13.....	79			328	438	.06	.33		\$0.18	.57
1913-14.....	84			293	1,473	.07	.31		.01	.39
1914-15.....	107	64	1,611	430	975	.08	.47	\$0.02	.03	.69
1915-16.....	109	63	1,169	431	1,215	.09	.56	.02	.02	.69
1916-17.....	102			341	1,242	.07	.53			.69

TABLE 6.—*Bacteria per cubic centimeter.*

(A) MAXIMUM.

Fiscal year.	Delecarlia Reservoir.		Georgetown Reservoir outlet.	McMillan Park Reservoir outlet.	Filtered water reservoir.
	Inlet.	Outlet.			
1906-7.....	68,000	24,000	23,000	15,000	200
1907-8.....	80,000	65,000	52,000	19,000	900
1908-9.....	90,000	12,500	13,000	2,500	160
1909-10.....	170,000	175,000	180,000	180,000	2,800
1910-11.....	75,000	49,000	26,000	26,000	300
1911-12.....	124,000	119,000	20,500	10,100	400
1912-13.....	35,000	15,000		2,200	31
1913-14.....	45,000	18,000	4,700	2,800	50
1914-15.....	68,000	34,000	12,300	9,800	108
1915-16.....	230,000	165,000	13,000	8,400	150
1916-17.....	65,000	30,000	26,000	6,600	165

TABLE 6.—*Bacteria per cubic centimeter*—Continued.

(B) MINIMUM.

Fiscal year.	Dalecarlia Reservoir.		Georgetown Reservoir outlet.	McMillan Park Reservoir outlet.	Filtered water reservoir.
	Inlet.	Outlet.			
1906-7.....	70	59	30	36	4
1907-8.....	16	17	23	16	4
1908-9.....	38	65	25	9	2
1909-10.....	37	80	43	22	3
1910-11.....	25	34	33	19	3
1911-12.....	35	34	70	3	1
1912-13.....	20	15	-----	4	1
1913-14.....	15	13	30	10	1
1914-15.....	68	15	30	12	1
1915-16.....	40	22	15	15	1
1916-17.....	12	19	16	19	1

(C) AVERAGE.

1906-7.....	4,860	1,940	1,680	635	31
1907-8.....	6,300	2,700	2,940	1,250	55
1908-9.....	3,180	1,950	950	300	21
1909-10.....	14,300	12,850	10,850	6,320	163
1910-11.....	4,820	3,370	2,080	1,300	38
1911-12.....	8,200	6,000	2,000	1,100	35
1912-13.....	1,180	670	-----	136	6
1913-14.....	3,200	1,200	500	260	7
1914-15.....	4,750	2,680	900	525	12
1915-16.....	5,540	4,720	990	405	15
1916-17.....	4,760	2,600	770	367	13

TABLE 7.—*Results of tests for bacillus coli.*

(A) TOTAL SAMPLES EXAMINED.

Fiscal year.	Great Falls or Dalecarlia Reservoir inlet.			Dalecarlia Reservoir outlet.			Georgetown Reservoir outlet.			McMillan Park Reservoir outlet (applied water).			Filtered water reservoir.		Tap water from various parts of the city.	
	10	1	0.1	10	1	0.1	10	1	0.1	10	1	0.1	10	1	10	1
1906-6.....	108	108	108	155	155	155	121	121	121	169	169	169	171	171	80	80
1907-7.....	156	156	156	130	130	130	131	131	131	222	222	222	222	222	523	523
1907-8.....	307	307	307	65	65	65	123	123	123	351	351	351	351	351	765	765
1908-9.....	266	266	266	40	40	40	106	106	106	365	365	365	365	365	782	782
1909-10.....	266	266	266	171	171	171	177	177	177	365	365	365	365	365	774	774
1910-11.....	262	262	262	305	305	305	305	305	305	364	364	364	365	365	766	766
1911-12.....	301	301	301	304	304	304	218	218	218	362	362	362	362	362	770	770
1912-13.....	271	271	271	304	304	304	-----	-----	-----	365	365	365	365	365	814	814
1913-14.....	302	302	302	302	302	302	256	256	256	365	365	365	365	365	843	843
1914-15.....	304	304	304	304	304	304	304	304	304	365	365	365	365	365	855	855
1915-16.....	305	305	305	305	305	305	305	305	305	366	366	366	366	366	886	886
1916-17.....	306	306	306	305	305	305	305	305	305	365	365	365	365	365	885	885

TABLE 7.—Results of tests for bacillus coli—Continued.

(B) NUMBER POSITIVE.

Fiscal year.	Great Falls or Dalecarlia Reservoir inlet.			Dalecarlia Reservoir outlet.			Georgetown Reservoir outlet.			McMillan Park Reservoir outlet (applied water).			Filtered water reservoir.		Tap water from various parts of the city.	
	10	1	0.1	10	1	0.1	10	1	0.1	10	1	0.1	10	1	10	1
1905-6.....	38	21	10	62	36	8	32	18	2	41	14	3	4	3	1	0
1906-7.....	98	68	30	75	38	16	67	39	14	95	38	4	13	6	28	5
1907-8.....	137	96	40	21	8	2	42	27	5	78	33	5	10	1	24	7
1908-9.....	115	60	25	12	6	0	29	9	3	61	26	3	3	0	9	3
1909-10.....	130	77	29	77	41	15	67	35	11	86	38	4	12	3	17	7
1910-11.....	110	49	15	92	35	5	60	11	2	53	8	0	3	0	12	5
1911-12.....	165	131	61	149	104	43	71	46	11	84	38	11	8	3	29	7
1912-13.....	180	129	64	166	115	52	.....	.....	.....	138	78	33	31	3	52	17
1913-14.....	226	157	61	192	115	25	127	60	16	97	38	6	7	1	13	8
1914-15.....	195	122	48	151	90	24	85	32	4	47	13	2	4	0	18	3
1915-16.....	181	137	70	135	83	23	58	24	2	22	7	0	0	0	4	2
1916-17.....	209	160	88	184	110	35	94	33	1	48	12	0	0	0	0	0

(C) PERCENTAGE POSITIVE.

1905-6.....	35.2	19.4	9.3	40.0	23.2	5.2	26.4	14.9	1.7	24.3	8.3	1.8	2.3	1.8	1.3	0.0
1906-7.....	61.5	43.6	19.2	57.7	29.2	12.3	51.1	29.8	10.7	32.5	13.0	1.4	4.5	2.1	5.4	1.0
1907-8.....	44.6	31.3	13.0	32.3	12.3	13.1	34.4	22.1	4.1	22.2	9.4	1.4	2.8	.3	3.1	.9
1908-9.....	38.9	20.3	8.4	30.0	15.0	.0	27.4	8.5	2.8	16.7	7.1	.8	.8	.0	2.2	.4
1909-10.....	45.5	26.9	10.1	45.3	24.0	8.8	37.9	19.8	6.2	23.6	10.4	1.1	3.3	.8	2.2	.7
1910-11.....	37.6	16.8	5.1	30.2	11.5	1.6	19.7	3.6	7	14.6	2.2	.0	.8	.0	1.6	.4
1911-12.....	54.8	43.5	20.3	49.2	34.3	14.2	32.6	21.1	5.0	23.2	10.5	3.0	2.2	.8	3.8	.9
1912-13.....	66.9	45.5	23.9	54.5	38.1	16.9	.....	.....	.....	37.8	21.4	9.1	8.5	.8	6.2	1.9
1913-14.....	74.9	51.9	20.2	63.5	38.1	8.3	49.4	23.1	6.2	26.5	10.4	1.6	1.9	.3	1.6	.9
1914-15.....	64.1	40.1	15.8	49.8	29.6	7.9	27.8	10.5	1.3	12.8	3.6	.6	1.1	.0	2.0	.3
1915-16.....	59.3	44.9	22.9	44.3	27.2	7.5	19.1	7.9	.6	6.0	1.9	.0	.0	.0	.5	.2
1916-17.....	68.5	52.5	28.9	60.3	36.1	11.5	30.8	10.8	.3	13.2	3.3	.0	.0	.0	.0	.0

(D) AVERAGE NUMBER PER 100 CUBIC CENTIMETERS.

1910-11.....	65.0	28.4	11.0	.....	.....	.....	.....	.....	.....	4.0	0.1	0.8
1911-12.....	215.1	145.7	55.5	.....	.....	.....	.....	.....	.....	37.6	1.0	1.1
1912-13.....	248.5	192.0	.....	.....	.....	.....	.....	.....	.....	104.7	1.7	2.4
1913-14.....	235.4	110.9	69.9	.....	.....	.....	.....	.....	.....	34.0	1.1	1.1
1914-15.....	597.5	218.5	23.8	.....	.....	.....	.....	.....	.....	9.3	.1	.5
1915-16.....	575.4	184.3	13.0	.....	.....	.....	.....	.....	.....	2.3	.1	.3
1916-17.....	1,109.6	340.0	15.7	.....	.....	.....	.....	.....	.....	4.4	.0	.0

TABLE 8.—Summary of sanitary analyses of weekly samples.

(A) MAXIMUM.

[Results in parts per million.]

	Tur- bidity.	Ammonia.			Nitrogen as—		Hard- ness.	Alka- linity.	Chlo- rine.
		Free.	Albu- minoid.	Total.	Ni- trites.	Ni- trates.			
Dalecarlia Reservoir inlet	3,200	0.070	0.466	0.470	0.032	0.90	112.7	87.0	6.3
Dalecarlia Reservoir outlet....	800	.152	.232	.384	.040	1.50	112.8	91.5	6.2
Georgetown Reservoir outlet...	80	.150	.252	.364	.032	1.30	105.3	87.0	6.0
McMillan Park Reservoir out- let.....	28	.088	.252	.268	.085	1.20	112.0	83.0	6.3
Filtered water.....	1	.004	.052	.052	.016	1.60	101.4	81.0	6.4

¹ Summary of daily samples.

TABLE 8.—Summary of sanitary analyses of weekly samples—Continued.

(B) MINIMUM.

[Results in parts per million.]

	Turbidity.	Ammonia.			Nitrogen as—		Hardness.	Alkalinity.	Chlorine.
		Free.	Albuminoid.	Total.	Nitrates.	Nitrites.			
Dalecarlia Reservoir inlet.....	5	0	0.014	0.014	0.000	0	39.7	30.5	2.8
Dalecarlia Reservoir outlet.....	6	0	.020	.028	.001	0	44.5	31.5	2.5
Georgetown Reservoir outlet.....	7	0	.026	.026	.001	0	41.0	25.0	2.7
McMillan Park Reservoir outlet.....	2	0	.008	.010	.001	0	47.5	24.5	2.7
Filtered water.....	0	0	.002	.002	0	0	46.5	23.0	2.8

(C) AVERAGE.

Dalecarlia Reservoir inlet.....	133	0.018	0.096	0.114	0.010	0.20	71.3	61.0	4.2
Dalecarlia Reservoir outlet.....	54	.032	.085	.116	.010	.23	72.0	62.7	4.3
Georgetown Reservoir outlet.....	18	.048	.078	.126	.009	.26	71.0	60.5	4.2
McMillan Park Reservoir outlet.....	10	.014	.052	.066	.009	.26	70.4	60.2	4.1
Filtered water.....	0	.000	.017	.018	.002	.27	69.1	59.0	4.0

TABLE 9.—Number of deaths from typhoid fever in District of Columbia.

(A) TOTAL NUMBER BY MONTHS.

Fiscal year.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	Total.
1896-97.....	8	15	25	25	18	16	13	4	4	4	6	9	147
1897-98.....	10	16	18	10	9	18	8	4	2	9	6	20	130
1898-99.....	24	22	22	28	21	16	10	4	7	6	2	6	169
1899-1900.....	9	38	30	28	27	26	17	6	8	10	8	12	216
1900-1901.....	20	41	29	25	28	17	7	8	8	2	4	10	193
1901-2.....	16	33	28	21	22	16	19	8	12	9	13	9	206
1902-3.....	21	39	25	32	19	20	9	5	9	6	6	3	194
1903-4.....	17	26	18	19	8	14	5	5	6	10	8	8	144
1904-5.....	16	22	25	14	11	9	11	1	5	7	1	3	125
1905-6.....	15	30	23	26	14	6	6	4	5	4	10	9	122
1906-7.....	21	32	21	25	17	4	7	6	4	6	7	2	132
1907-8.....	10	18	17	19	11	7	4	1	1	8	8	3	107
1908-9.....	15	13	23	17	16	13	16	8	3	8	7	7	146
1909-10.....	12	12	17	12	12	2	3	4	7	5	5	4	95
1910-11.....	6	12	13	8	9	5	6	4	4	3	8	2	80
1911-12.....	5	11	7	5	8	11	8	1	1	4	2	2	65
1912-13.....	11	9	16	11	8	6	4	4	4	2	2	5	82
1913-14.....	7	9	2	11	2	4	3	4	2	1	1	4	50
1914-15.....	4	11	8	3	2	4	2	2	4	1	2	2	45
1915-16.....	4	7	3	6	9	1	3	1	2	3	2	6	47
1916-17.....	7	8	7	3	3	1	3	0	0	4	1	2	39
Average.....	12.6	20.6	18.3	16.6	13.2	10.3	7.8	4.0	4.7	5.3	5.1	6.1	124.7

1 Filtered water supplied since October, 1905.

3688 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1917.

TABLE 9.—Number of deaths from typhoid fever in District of Columbia—

(B) DEATH RATE PER 100,000.

Fiscal year.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	Annual death rate.
1898-97.....	35	65	109	109	78	70	56	17	17	17	26	39	53
1897-98.....	43	69	78	43	39	78	34	17	8	38	25	85	46
1898-99.....	102	93	93	119	89	68	42	17	29	25	12	25	59
1899-1900.....	37	158	125	116	112	108	69	24	33	41	20	49	74
1900-1901.....	82	167	118	102	114	69	28	8	32	8	16	40	65
1901-2.....	64	132	112	84	88	64	75	31	47	35	51	35	66
1902-3.....	83	153	98	136	75	79	35	19	35	23	23	12	63
1903-4.....	66	100	69	73	31	54	19	19	23	38	30	30	46
1904-5.....	61	83	95	53	42	34	41	4	19	26	4	11	39
1905-6.....	56	111	85	97	52	22	22	15	18	15	36	33	47
1906-7.....	69	105	69	82	56	13	24	20	13	20	24	7	43
1907-8.....	35	64	60	67	39	25	14	4	4	28	28	11	32
1908-9.....	53	45	80	60	56	45	56	28	10	28	24	24	43
1909-10.....	42	42	60	42	42	7	11	14	24	17	17	14	28
1910-11.....	21	41	45	28	31	17	21	14	14	10	28	7	23
1911-12.....	17	37	24	17	27	37	27	3	3	14	7	7	18
1912-13.....	37	31	52	26	26	19	13	13	13	7	7	17	23
1913-14.....	24	30	7	36	7	14	10	14	7	3	3	14	14
1914-15.....	14	37	37	10	7	14	7	7	14	3	7	7	13
1915-16.....	13	23	10	30	30	3	10	3	7	7	7	20	13
1916-17.....	23	27	23	10	10	3	10	0	0	13	3	7	11
Average.....	46.5	76.6	69.6	63.8	50.4	40.1	29.7	13.8	17.6	10.9	19.0	23.5	39.0

TABLE 10.—Pumping station (daily results).

(A)

Fiscal year.	Million gallons pumped—						Lift to filters.	Pressure per square inch at sand-washer pumps.	Tons of coal consumed per day.			Station duty per 100 pounds of coal consumed.		
	To filters.			To sand washers.					Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.
	Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.								
1906-6.....	80.59	57.18	66.07	2.062	0.089	0.747	21.71	107.4	14.8	6.4	8.9	79.6	48.2	62.8
1906-7.....	80.29	57.44	65.89	2.120	.023	.590	21.60	120.8	15.0	7.0	10.0	71.6	46.5	58.6
1907-8.....	80.38	54.35	64.91	.785	.017	.347	22.20	125.0	12.0	7.2	9.6	70.7	51.3	60.3
1908-9.....	78.93	47.83	61.47	.875	.060	.453	22.52	122.3	13.2	7.0	10.0	74.0	45.7	57.7
1909-10.....	78.50	48.12	59.19	1.140	.008	.373	21.45	113.3	13.4	7.4	9.8	67.8	44.8	54.0
1910-11.....	78.32	46.69	60.38	.908	.008	.340	21.45	120.0	13.4	7.6	9.9	64.6	42.9	54.6
1911-12.....	72.72	45.61	61.94	.726	.002	.339	23.55	120.0	15.5	8.6	11.1	61.8	42.5	54.0
1912-13.....	74.42	45.40	57.44	.829	.017	.348	22.61	120.0	15.3	7.7	10.6	62.3	40.8	51.3
1913-14.....	73.68	44.76	55.42	.646	.062	.324	22.37	120.0	16.3	19.0	11.7	63.5	39.9	60.7
1914-15.....	72.86	42.37	54.54	.704	.015	.337	22.26	120.0	14.6	18.9	11.0	61.4	41.2	50.8
1915-16.....	62.34	39.95	51.91	.492	.022	.289	23.13	115.0	13.7	18.4	11.1	58.8	38.8	48.9
1916-17.....	68.82	39.06	53.81	1.346	.008	.417	21.74	115.0	16.5	17.0	11.7	60.2	36.1	46.3

¹ Short tons.

TABLE 10.—Pumping station (daily results)—Continued.

(B)

Fiscal year.	Name of coal used.	Cost per ton.	Duty per 100 pounds of coal consumed.	Cost of coal per million foot-pounds of work performed.
1905-6.....	Georges Creek Big Vein.....	\$3.34	62.8	\$0.00288
1906-7.....	do.....	3.43	58.6	.00261
1907-8.....	do.....	3.75	60.3	.00273
1908-9.....	Oreanda.....	3.47	57.7	.00262
1909-10.....	do.....	3.15	54.0	.00255
1910-11.....	do.....	3.19	54.5	.00252
1911-12.....	do.....	3.00	54.0	.00256
1912-13.....	do.....	3.24	51.3	.00262
1913-14.....	Jenner.....	3.14	60.7	.00260
1914-15.....	do.....	3.21	60.8	.00261
1915-16.....	do.....	2.80	48.9	.00231
1916-17.....	Miscellaneous.....	7.60	46.3	.00322

¹ Corrected for increase or decrease in ash and British thermal units by United States Geological Survey.

(C) COST PER MILLION GALLONS FILTERED.

Fiscal year.	Office.		Operating force.	Coal.	and repairs. ²	Total.
	Filtration.	Main.				
1905-6.....	\$0.05	\$0.04	\$0.44	\$0.56	\$0.02	\$1.11
1906-7.....	.12	.02	.52	.51	.12	1.29
1907-8.....	.15	.04	.56	.56	.17	1.50
1908-9.....	.16	.05	.56	.50	.15	1.43
1909-10.....	.18	.05	.60	.49	.17	1.56
1910-11.....	.18	.02	.61	.52	.14	1.47
1911-12.....	.16	.04	.59	.47	.12	1.38
1912-13.....	.17	.07	.65	.61	.13	1.63
1913-14.....	.18	.09	.71	.68	.20	1.96
1914-15.....	.14	.04	.65	.68	.31	1.77
1915-16.....	.13	.04	.75	.60	.28	1.76
1916-17.....	.12	.08	.77	1.45	.18	2.55

TABLE 11.—Filter runs or periods of operation.

(A) FOLLOWING BOTH RAKINGS AND SCRAPINGS.

Fiscal year.	Number of runs ending.	Duration in days.			Million gallons filtered.		
		Maximum.	Minimum.	Average.	Maximum.	Minimum.	Average.
1906-6.....	72	195	38	61	497.45	116.66	241.36
1906-7.....	105	199	30	75	466.12	101.53	217.78
1907-8.....	219	138	9	46	477.19	20.11	121.46
1908-9.....	179	135	11	46	298.08	30.26	115.17
1909-10.....	142	129	21	70	307.57	45.22	154.94
1910-11.....	163	139	17	62	304.83	41.55	138.78
1911-12.....	188	102	12	49	267.17	24.76	114.39
1912-13.....	165	121	16	61	252.84	53.91	131.13
1913-14.....	123	150	35	76	344.78	64.66	156.71
1914-15.....	114	197	25	63	399.98	37.03	157.09
1915-16.....	118	156	24	71	273.62	32.13	140.55
1916-17.....	175	189	15	65	442.85	22.13	127.16

(B) FOLLOWING RAKINGS.

1910-11.....	76	139	17	53	304.83	41.55	114.53
1911-12.....	79	78	14	44	169.16	24.76	101.06
1912-13.....	83	121	16	54	225.67	53.91	115.48
1913-14.....	64	133	35	73	308.04	64.66	148.42
1914-15.....	69	197	36	99	399.98	81.84	198.22
1915-16.....	73	108	24	63	273.26	32.13	125.45
1916-17.....	119	189	15	63	442.85	22.13	123.65

(C) FOLLOWING SCRAPINGS.

1910-11.....	87	130	22	70	280.81	48.60	159.97
1911-12.....	109	102	12	52	267.17	32.69	124.67
1912-13.....	82	121	17	69	252.84	37.14	145.97
1913-14.....	59	150	40	83	346.78	82.65	169.95
1914-15.....	45	147	25	84	285.98	37.52	167.09
1915-16.....	45	156	31	85	273.62	63.55	165.05
1916-17.....	56	163	19	70	411.88	37.61	134.61

TABLE 12.—Depth, scraping, and resanding.

Fiscal year.	Number of filters scraped.	Depth of scraping, in inches.			Number of filters resanded.	Depth of sand replaced, in inches.		
		Maximum.	Minimum.	Average.		Maximum.	Minimum.	Average.
1906-6.....	68.07	4.47	0.53	1.77	4	17.2	12.0	15.2
1906-7.....	97.76	4.00	.89	1.95	13	19.9	7.9	13.3
1907-8.....	126.67	4.10	.34	1.34	11	18.1	10.1	14.9
1908-9.....	137.8	4.32	.41	1.58	12	21.2	9.2	14.9
1909-10.....	87.2	3.90	.60	1.33	7	22.0	10.1	15.7
1910-11.....	91.0	3.26	.35	1.22	7	16.3	11.8	14.0
1911-12.....	104.4	2.36	.36	1.06	9	16.5	11.5	13.3
1912-13.....	84.6	2.80	.71	1.30	10	17.6	8.1	11.2
1913-14.....	62.0	4.50	1.32	1.48	6	12.7	8.0	9.9
1914-15.....	42.7	2.06	.75	1.25	4	12.5	8.8	9.9
1915-16.....	42.3	3.22	.92	1.43	6	12.0	9.1	11.1
1916-17.....	53.0	4.91	1.06	1.58	8	13.5	8.6	10.3

¹ Four filters filled by hydraulic injector. During the following years all filters filled by injector.

TABLE 13.—*Rates of sand handling.*

Fiscal year.	Sand removed from filters.			Sand replaced in filters.		
	Ejector hours.	Cubic yards removed.	Average rate cubic yards per hour.	Ejector hours.	Cubic yards replaced.	Average rate cubic yards per hour.
1904-05		16,137			5,172	
1905-06	4,108	25,689	6.2		34,781	
1906-07	3,132	22,275	7.1		21,393	
1907-08	2,734	24,683	9.1		23,487	12.3
1908-09	1,717	15,505	9.1		16,876	10.6
1909-10	1,355	14,941	10.0	674	13,218	19.6
1910-11	1,354	14,820	10.9	864	16,085	18.6
1911-12	1,229	14,264	11.6	847	15,027	17.7
1912-13	1,013	12,343	12.2	672	12,775	19.0
1913-14	605	7,203	11.9	322	5,314	16.5
1914-15	674	8,171	12.1	543	8,974	16.5
1915-16	1,007	11,307	11.2	744	11,063	14.9

¹ Part of sand replaced by carts.TABLE 14.—*Filter operations.*

Fiscal year.	Million gallons water pumped to—		Number of filters—		Cubic yards of sand—	
	Filters.	Sand washers.	Scraped.	Raked.	Removed and washed.	Replaced in filters.
1904-05	19,402.82	42.40	68.07		16,137	5,172
1905-06	24,417.73	138.70	97.76	9	25,689	34,781
1906-07	23,758.24	76.96	126.67	86	22,275	21,393
1907-08	22,435.16	119.16	137.90	36	24,683	23,487
1908-09	21,605.44	91.777	87.2	51	15,505	16,876
1909-10	22,039.95	79.920	91.0	71	14,941	13,218
1910-11	22,668.40	84.856	104.4	83	14,820	16,085
1911-12	20,978.19	81.313	84.65	79	14,264	15,027
1912-13	20,596.50	69.249	62.0	62	12,343	12,775
1913-14	19,908.89	39.541	42.7	72	7,203	5,314
1914-15	18,999.51	44.350	42.3	78	8,171	8,974
1915-16	19,639.85	68.449	53.0	122	11,307	11,063

¹ First filter put in service Aug. 18; total water supply filtered after Oct. 6.² 8,324 cubic yards washed.³ 33,502 cubic yards washed.TABLE 15.—*Cost per million gallons for filter operations.*

(A) LABOR.

Fiscal year.	Office.		Laboratory.	Scraping.	Ejecting and washing.	Smoothing.	Resanding.	Rating.	Incidentals and repairs.	Filter attendants.	Pumping wash water.	Total.
	Filtration.	Main.										
1904-05	\$0.06	\$0.05	\$0.20	\$0.06	\$0.21	\$0.06	\$0.04		\$0.02	\$0.14	\$0.01	\$0.95
1905-06	.13	.02	.18	.07	.25	.02	.24		.24	.11	.05	1.31
1906-07	.18	.04	.20	.09	.17	.01	.13	\$0.02	.41	.11	.03	1.39
1907-08	.17	.06	.20	.07	.18	.01	.14	.01	.35	.12	.05	1.26
1908-09	.23	.07	.19	.05	.11	.01	.09	.01	.23	.12	.04	1.15
1909-10	.23	.08	.18	.06	.09	.01	.03	.02	.07	.12	.04	.87
1910-11	.19	.05	.18	.06	.08	.01	.03	.02	.07	.12	.03	.84
1911-12	.19	.08	.15	.06	.07	.01	.04	.03	.11	.13	.04	.91
1912-13	.20	.04	.19	.05	.07	.01	.03	.02	.20	.13	.03	.97
1913-14	.19	.04	.22	.03	.03	.00	.02	.02	.22	.14	.02	.90
1914-15	.20	.06	.19	.04	.04	.00	.03	.02	.07	.14	.02	.81
1915-16	.24	.06	.19	.06	.07	.00	.04	.04	.06	.14	.03	.92

TABLE 15.—*Cost per million gallons for filter operations—Continued.*

(B) MATERIALS.

Fiscal year.	Office.		Laboratory.	Scraping.	Electing and washing.	Smoothing.	Resanding.	Raking.	Incidentals and repairs.	Filter attendants.	Pumping wash water.	Total.
	Filtration.	Main.										
1905-6.....	\$0.01	.....	\$0.03	.....	\$0.02	.....	.....	.....	.....	.....	\$0.01	\$0.07
1906-7.....	.01	.....	.02	\$0.01	.06	.....	\$0.01	.....	\$0.20	.....	.04	.25
1907-8.....	.01	\$0.01	.04	.....	.04	.....	.....	.....	.07	.....	.02	.19
1908-9.....	.02	.02	.08	.01	.03	.....	.01	.....	.18	.....	.04	.30
1909-10.....	.02	.02	.11	.....	.02	.....	.....	.....	.06	.....	.03	.26
1910-11.....	.01	.01	.07	.01	.03	.....	.01	.....	.06	.....	.03	.26
1911-12.....	.02	.....	.15	.....	.03	.....	.....	\$0.01	.08	.....	.08	.27
1912-13.....	.01	.01	.05	.01	.04	.....	.03	.01	.11	.....	.03	.30
1913-14.....	.01	.....	.07	.....	.03	.....	.02	.....	.10	.....	.04	.27
1914-15.....	.03	.00	.06	.....	.02	.....	.01	.....	.01	.....	.02	.15
1915-16.....	.02	.....	.04	.....	.01	.....	.01	.....	.02	.....	.02	.12
1916-17.....	.01	.....	.07	.....	.03	.....	.03	.....	.02	.....	.05	.21

(C) LABOR AND MATERIALS.

	\$0.07	\$0.05	\$0.23	\$0.06	\$0.33	\$0.06	\$0.04	.....	\$0.02	\$0.14	\$0.02	\$1.02
1905-6.....	.14	.02	.20	.08	.31	.02	.25	.....	.44	.11	.09	1.06
1906-7.....	.19	.05	.24	.09	.21	.01	.13	\$0.02	.48	.11	.06	1.58
1907-8.....	.19	.08	.28	.08	.21	.01	.15	.01	.53	.12	.09	1.75
1908-9.....	.25	.09	.30	.05	.13	.01	.09	.01	.28	.12	.07	1.40
1909-10.....	.23	.04	.25	.07	.12	.01	.04	.02	.15	.12	.07	1.12
1910-11.....	.21	.05	.33	.06	.11	.01	.03	.03	.10	.12	.06	1.11
1911-12.....	.20	.09	.20	.07	.11	.01	.07	.04	.22	.13	.07	1.21
1912-13.....	.21	.04	.26	.05	.10	.01	.05	.02	.30	.13	.07	1.24
1913-14.....	.22	.04	.28	.02	.05	.....	.03	.02	.23	.14	.04	1.08
1914-15.....	.22	.06	.23	.04	.05	.....	.04	.02	.09	.14	.04	.98
1915-16.....	.25	.06	.26	.05	.10	.....	.07	.....	.08	.14	.06	1.13

TABLE 16.—*Summary of costs per million gallons.*

Operation of Washington Aqueduct.....	\$0.69
Preliminary treatment.....	.60
Pumping.....	2.55
Filter operations.....	1.18
Buildings and grounds.....	.91
Guarding property.....	.51
Extensions and betterments.....	.38
Total.....	6.77

2. EMERGENCY FUND.

No expenditures were made from this fund this year.

3. CONTINUATION OF PARKING GROUNDS OF M'MILLAN PARK.

McMillan Park is located in the District of Columbia between Michigan Avenue and Bryant Street and North Capitol and Fourth Streets NW. It contains 118 acres, and comprises the filtration plant, the reservoir of the same name, and the grounds surrounding them.

The work done this fiscal year was located on the northern and western parts of McMillan Park.

The amount and cost of the work was as follows:

Soil purchased, 1,000 cubic yards, at \$1.25-----	\$1,250.00
Trees purchased, 115, at \$2.717-----	312.55
Shrubs purchased, 1,551, at \$0.233-----	361.44
Labor for planting above shrubs and trees, and also for planting 1,400 shrubs propagated on the grounds-----	1,076.01
Total-----	3,000.00

4. ORDINARY REPAIRS, ETC., CONDUIT ROAD.

The work done under this heading consisted of ordinary repairs to the macadam road surface, grading, opening ditches, and other maintenance of the Conduit Road.

The amount expended, including outstanding liabilities, was \$5,000.

TABLE 17.—*Appropriations for the Washington Aqueduct, dates of approval of acts, and revertments to Treasury.*

Total appropriations to July 1, 1902-----	\$8,583,290.89
Received for sale of land, etc-----	15,651.39
Interest on claim of Maloney & Gleason-----	4,719.68
	8,603,661.96
Reverted to Treasury-----	39,522.29

Net amount expended of above to June 30, 1902----- **8,564,139.67**

Appropriations 1903–April 17, 1917, inclusive:

Mar. 3, 1903, maintenance and operation-----	\$33,000.00
Mar. 27, 1904, maintenance and operation-----	33,000.00
Mar. 3, 1905, maintenance and operation-----	33,000.00
June 27, 1906, maintenance and operation-----	33,000.00
Mar. 2, 1907, maintenance and operation-----	33,000.00
Purchase of dredge-----	30,000.00
Dredging-----	16,000.00
Riprapping shore-----	2,000.00
Riprapping sides-----	18,000.00
Parking grounds-----	3,000.00
May 26, 1908, maintenance and operation-----	33,000.00
Parking-----	6,000.00
Mar. 3, 1909, maintenance and operation-----	33,000.00
May 18, 1910, maintenance and operation-----	33,000.00
Parking grounds-----	2,000.00
Mar. 2, 1911, maintenance and operation-----	33,000.00
Parking grounds-----	2,000.00
Lining tunnels-----	8,000.00
Repairing Cabin John Bridge-----	35,000.00
June 26, 1912, maintenance and operation-----	33,000.00
Parking grounds-----	2,000.00
Lining tunnels-----	10,000.00
Surfacing Conduit Road-----	15,000.00
Mar. 4, 1913, maintenance and operation-----	34,500.00
Parking grounds-----	2,000.00
Lining tunnels-----	10,000.00
Surfacing Conduit Road-----	15,000.00
July 21, 1914, maintenance and operation-----	34,500.00
Parking grounds-----	3,000.00
Lining tunnels-----	10,000.00
Surfacing Conduit Road-----	15,000.00
House for assistant to overseer at Great Falls, Md-----	1,000.00
Mar. 3, 1915, maintenance and operation-----	119,000.00
Parking grounds-----	3,000.00
Lining tunnels-----	10,000.00

3694 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1917.

Appropriations 1903-April 17, 1917, inclusive—Continued.

Mar. 3, 1915, maintenance and operation—Continued.

Widening and improving Conduit Road	\$15,000.00
Ordinary repairs, etc., Conduit Road	5,000.00
Emergency fund	3,940.92
Sept. 1, 1916, maintenance and operation	123,000.00
Ordinary repairs, etc., Conduit Road	5,000.00
Parking grounds	3,000.00
Emergency fund	5,000.00
Apr. 17, 1917, maintenance and operation deficiency	10,000.00

\$905,940.92

Reverted to Treasury 1903-1915	12,560.50
Reverted to Treasury 1916	4,138.28
Reverted to Treasury 1917	5,000.00

9,470,080.59

21,748.78

Amount expended, including outstanding liabilities, to June 30, 1917

9,448,331.81

For construction

7,911,061.74

For maintenance and operation

1,537,270.07

Paid by the United States

6,558,818.19

Paid by the District of Columbia

2,748,513.62

Paid by the water department, District of Columbia

141,000.00

9,448,331.81

Appropriations for purification plant:

Total appropriations to Dec. 31, 1902 (see Annual Report, 1912, p. 3480)

\$1,300,250.00

Mar. 3, 1903, construction

600,000.00

Apr. 27, 1904, construction

1,568,155.00

Reappropriated for purchase of land (by act of May 30, 1908)

8,000.00

Reappropriated for maintenance and operation (by act of Mar. 3, 1905)

70,000.00

Reverted to Treasury

19,559.01

Mar. 3, 1905, maintenance and operation

70,000.00

Reverted to Treasury

21,539.78

June 27, 1906, maintenance and operation

80,000.00

Reverted to Treasury

1,175.33

Mar. 2, 1907, maintenance and operation

90,000.00

Reappropriated for parking (by act of May 26, 1908)

6,000.00

Reverted to Treasury

1,892.61

May 26, 1908, maintenance and operation

82,000.00

May 26, 1908, emergency

5,000.00

Reverted to Treasury

5,000.00

May 30, 1908, purchase of land

8,000.00

Mar. 3, 1909, maintenance and operation

82,000.00

Mar. 3, 1909, emergency

5,000.00

Reverted to Treasury

5,000.00

May 18, 1910, maintenance and operation

82,000.00

May 18, 1910, coagulating plant

27,500.00

May 18, 1910, emergency

5,000.00

Reverted to Treasury

5,000.00

Mar. 2, 1911, maintenance and operation

91,000.00

Mar. 2, 1911, remodeling Georgetown Reservoir

50,000.00

Reverted to Treasury

4,907.40

Mar. 2, 1911, emergency

5,000.00

Reverted to Treasury

5,000.00

June 26, 1912, maintenance and operation

91,000.00

Appropriations for purification plant—Continued.

June 28, 1912, remodeling Georgetown Reservoir	\$58,000.00	
Reverted to Treasury		\$476.88
June 28, 1912, emergency	5,000.00	
Reverted to Treasury		3,429.16
Mar. 4, 1913, maintenance and operation	91,000.00	
Mar. 4, 1913, emergency	3,429.16	
Reverted to Treasury		3,429.16
July 21, 1914, maintenance and operation	91,000.00	
Reverted to Treasury		81.70
July 21, 1914, emergency	5,000.00	
Reverted to Treasury		3,940.92
Total	4,495,334.16	164,481.95
Net amount expended	4,330,902.21	
For construction	3,508,961.71	
For maintenance and operation	821,940.50	
Paid by the United States	2,165,451.105	
Paid by the District of Columbia	2,165,451.105	

Appropriations for investigations for additional supply:

May 28, 1908, preliminary investigations		10,000.00
Mar. 2, 1911, investigating Patuxent River		3,000.00
June 28, 1912, Great Falls water power		20,000.00
Total appropriated		33,000.00
Reverted to Treasury		1.00
Net amount expended		32,999.00
Paid by the United States		16,499.50
Paid by the District of Columbia		16,499.50

Appropriations for metering Government services:

May 18, 1910		7,000.00
June 28, 1912		4,850.00
Mar. 4, 1913		4,700.00
July 21, 1914		4,300.00
Total appropriations		20,850.00
Reverted to Treasury		1,553.54
Net amount expended		19,296.46
Paid by the United States		9,648.23
Paid by the District of Columbia		9,648.23

1909

1910

1911

1912

1913

1914

1915

1916

1917

1918

1919

1920

1921

1922

1923

1924

1925

1926

1927

1928

1929

1930

1931

1932

1933

1934

1935

1936

1937

1938

1939

1940

1941

1942

1943

1944

1945

IMPROVEMENT AND CARE OF PUBLIC BUILDINGS AND GROUNDS IN
THE DISTRICT OF COLUMBIA—WASHINGTON MONUMENT—HIGH-
WAY BRIDGE, DISTRICT OF COLUMBIA—MONUMENTS AND MEMO-
RIALS.

REPORT OF COL. WILLIAM W. HARTS, UNITED STATES ARMY.

CONTENTS.

	Page.
A. Public buildings:	
1. Executive Mansion, care, repair, refurnishing, etc.....	3698
2. Executive Office Building.....	3699
3. Executive Mansion greenhouses.....	3699
4. Executive Mansion Grounds.....	3699
5. House where Abraham Lincoln died.....	3721
6. Buildings occupied as offices by the War Department.....	3722
7. State, War, and Navy Department Building.....	3722
B. Public reservations in the District of Columbia:	
1. Reservations added to park system during the year.....	3700
2. Reservations improved during year.....	3701
3. Maintenance of improved parks.....	3701
4. Northwest division.....	3702
5. Southwest division.....	3705
6. East division.....	3707
7. Water and drain pipes and fountains.....	3707
C. Lighting the public grounds.....	3707
D. Walks, roads, curbing, and coping:	
1. Report.....	3708
2. Table.....	3708
E. Occupation of public grounds by private parties.....	3709
F. Benches, compost grounds, fences, and lodges.....	3709
G. Children's playgrounds.....	3709
H. Park watchmen:	
1. Report.....	3709
2. Table of arrests.....	3711
3. Recommendations.....	3711
I. Band concerts.....	3712
J. Potomac Park and Monument Grounds:	
1. Maintenance of improved portions, west Potomac Park.....	3713
2. Improvement of interior portion, west Potomac Park.....	3713
3. Care and improvement, East Potomac Park.....	3714
4. Field House, East Potomac Park.....	3715
5. Monument Grounds.....	3715
K. Preparing ground for outdoor sports.....	3715
L. Reservations used for Inaugural Purposes, 1917.....	3717
M. Public Grounds used for Confederate Veterans' Reunion.....	3718
N. Connecting parkway between Potomac Park, the Zoological Park, and Rock Creek Park.....	3718
O. Washington Monument:	
1. General report.....	3718
2. Table.....	3719
P. Propagating Gardens:	
1. General report.....	3720
2. List of stock propagated, purchased, and distributed.....	3720
3. Storehouse and shops building.....	3721
Q. Departmental telegraph line.....	3722
R. Highway Bridge across the Potomac River, D. C.....	3722

	Page.
S. Grounds of Library of Congress.....	3723
T. Grounds of Capitol.....	3723
U. Grounds of Executive departments.....	3723
V. United States wharf property, Washington, D. C.....	3723
W. Monument and wharf at birthplace of Washington.....	3724
X. Statues:	
1. General report.....	3720
2. Memorial to Gen. Ulysses S. Grant.....	3724
3. Statue of Commodore John Barry.....	3724
Y. Memorial to Abraham Lincoln.....	3724
Z. District of Columbia Armory Commission.....	3725
Z1. Commission of Fine Arts.....	3725
Z2. Memorial to commemorate women of Civil War.....	3725
Z3. Arlington Memorial amphitheater and chapel.....	3726
Z4. Monument to Francis Scott Key and others.....	3727
Z5. Arlington Memorial Bridge.....	3727
Z6. Public Buildings Commission.....	3728
Z7. Distribution of expenditures.....	3728
Z8. Abstract of contracts in force during year.....	3729

PHOTOGRAPHS.

1. Memorial to Abraham Lincoln.....	3726
2. Memorial to Women of the Civil War.....	3726
3. Arlington Memorial Amphitheater.....	3726

1. EXECUTIVE MANSION, GROUNDS, AND GREENHOUSES.

Care of mansion.—The work required to maintain the house in good condition was carried on in a systematic manner throughout the year. The hardwood floors in particular require much attention in the way of cleaning, waxing, etc., and this was done with regularity. The tile floors in the entrance vestibule and in the main corridor on the first floor were also given constant attention.

General repairs.—Repairs were made to the plastering in the house and on the east and west terraces. All loose tiling in the bathrooms was reset. Minor carpentry repairs were made, and the walls of the state dining room and private dining room were cleaned.

Heating.—The system was looked after carefully and maintained in efficient working condition.

Lighting and plumbing.—The electric lighting fixtures and wiring, as well as the electric-bell system, and all plumbing fixtures were kept in good order by constant repairs.

Painting.—The walls, ceilings, and woodwork in the ground-floor corridor, the main stairway leading to the first floor, the diplomatic dressing room, the kitchen, and the servants' dining room in west terrace were given two coats of paint. Two of the bathtubs were scraped and given two coats of paint and one coat of enamel. The walls of the elevator shaft were given one coat of water color, and walls between the landings of the stairway in the shaft were painted with two coats. Part of the walls on back stairway and all doors and frames in lower corridor were given one coat of paint, and the doors and frames were stained. The window sills in main lobby were given three coats of paint. The old paint on the wall and ceiling in the passage between the Executive Office and the Mansion was burned off where necessary and painted with four coats. The roof of the mansion was given one coat of paint. In November the exte-

rior of the building was washed down with soap and water to remove dirt that had collected during the summer months.

Elevator.—Necessary attention was given to the electric elevator and its operating machinery, and they were maintained in good running order.

Furniture and furnishings.—Minor repairs were made to furniture and some additional linen was purchased. All draperies were taken down from windows and doorways at the beginning of summer, dusted, and packed away. Floor rugs were also taken up, cleaned, and stored. All these were replaced in the autumn.

Social functions.—One large garden party was given in July and during the social season two large evening receptions, five state dinners, one dinner and dance, and one evening musicale were given. In addition, five large dinners of an official character were given. For these the necessary preparations devolving upon this office were made, namely, providing attendants for the cloakrooms and for calling carriages, waiters for the supper room, providing the floral decorations, moving and replacing furniture, and restoring the Mansion to its usual condition after the close of the functions.

Inventory of property.—In accordance with law an inventory of property was made, in duplicate, during the month of June. One copy was furnished to the custodian at the Mansion and the other is on file in this office.

Executive Office Building.—The usual care was extended to this building. Minor repairs were made to doors, windows, woodwork, plumbing fixtures, heating apparatus, and electric fixtures. The main vestibule, the offices of the President and secretary, the main corridors, Cabinet room, and press room were painted. The radiators were painted. The floors in all but those of the President's private office and the Cabinet room were shellacked.

Greenhouses, Executive Mansion.—These houses are located at the propagating gardens in the Monument Grounds. Necessary attention was given to the large collection of plants, which were maintained in good condition. Flowers were raised and regularly furnished for decorating the White House. The flues of boilers were cleaned, the boilers repaired, leaking pipe joints recalked, and pipe straightened. The work of replacing glass broken by a severe storm on June 10, 1916, and which was at once commenced, was carried on through July, August, and September, and completed in October. The greater portion of the appropriation for repairing these houses had to be devoted to this purpose. Necessary carpentry repairs were made to the 16 greenhouses. Old plant benches were removed and new ones installed. All new work was painted. In houses Nos. 12 and 13 the heating apparatus was overhauled. Two galvanized expansion tanks were installed in houses Nos. 8 and 12, respectively.

Grounds of Executive Mansion.—Constant attention was given to these grounds. Lawns were mowed and raked in the growing season, and roads, walks, sidewalks, pavements, gutters, and drain traps regularly cleaned. Ninety feet of cement coping was laid along the side of the walk at the west entrance to the grounds. Repairs were made to the display fountain in the south grounds. One hundred and eighty feet of 1½-inch galvanized-iron water pipe was laid in the north grounds and 66 feet of 6-inch terra-cotta drainpipe was run in

the flower garden south of the Mansion. The macadam roadway was treated with "Glutrin" over an area of 2,977 square yards. Fifteen square yards of asphalt roadway was repaired. In November 205 evergreen trees were planted in the fountain east of the Mansion for winter effect. During the winter months snow was removed from walks after each storm. In April four additional arc electric lights were installed in the grounds south of the house, and in June 14 poles for electric lights were erected. They will be fitted with lamps for supplying additional lights to these grounds.

2. PARKS AND PUBLIC RESERVATIONS IN THE DISTRICT OF COLUMBIA.

During the year 19 park spaces were added to the system by the transfer to the Chief of Engineers by the Commissioners of the District of Columbia of the following parcels of ground, under authority granted by section 2, paragraph (b) of the act of Congress approved July 1, 1898:

Number given to reservation.	Location of reservation.	Area.	Date of acceptance by the Chief of Engineers.
		<i>Square feet.</i>	
149a	Connecticut Avenue, Twentieth and R Streets NW.....	1,084.77	Aug. 15, 1916
312a	South Dakota Avenue, Twenty-sixth and Irving Streets NE.....	13,077.00	Sept. 22, 1916
312a	Illinois Avenue, Fifth and Upshur Streets NW.....	8,496.00	Nov. 6, 1916
335	Western Avenue and Patterson Street NE.....	10,710.00	Do.
312b	Rock Creek Church Road and Upshur Street NW.....	1,698.00	Jan. 16, 1917
336	Fort Davis, between T Street, Alabama Avenue, Thirty-eighth Street, and Pennsylvania Avenue SE.....	580,819.82	Jan. 2, 1917
837	Fort Dupont, Alabama Avenue and Burns Street SE.....	721,062.82	Do.
276a	Florida Avenue, First and R Streets NW.....	8,645.00	Jan. 27, 1917
277e	Lincoln Road, First and T Streets NE.....	24,026.00	Do.
306d	Columbia Road, Euclid and Champlain Streets NE.....	3,218.00	Do.
309g	Park Road, Sixteenth and Pine Streets NW.....	12,585.00	Do.
314a	Minnesota Avenue, Sixteenth and T Streets SE.....	6,008.00	Do.
312c	Illinois Avenue, Gallatin and Ninth Streets NW.....	24,333.00	Feb. 10, 1917
325e	Huntington Street, Thirty-eighth Street and Reno Road NW.....	12,342.00	Do.
326b	Reno Road, Twenty-ninth and Jenifer Streets NW.....	9,400.00	Do.
326b	Pennsylvania Avenue, Twenty-eighth and O Streets SE.....	19,618.00	Do.
326b	Minnesota Avenue, Twenty-second and Q Streets SE.....	15,079.00	Do.
326c	Naylor Road, Twenty-second and Q Streets SE.....	10,735.00	Do.
330a	Idaho Avenue, Thirty-seventh and Porter Streets NW.....	571.00	June 1, 1917

The transfer of the foregoing spaces increased the total park area by 1,483,684.11 square feet, or 34.06 acres.

In addition to the foregoing the commissioners transferred to the Chief of Engineers a strip of ground 5 feet wide along the entire R Street front of Montrose Park by reason of the reduction from 15 to 10 feet in width of the public sidewalk in front of that park. This strip, which added 3,435.55 square feet to the park area, was accepted by the Chief of Engineers on January 4, 1917.

The total park area was reduced by 3,447.28 square feet by the transfer by the Chief of Engineers of the following small areas which were taken from the parks mentioned and given to the commissioners for street purposes under the authority contained in the act of July 1, 1898, referred to:

Park from which taken.	Location of reservation.	Area taken.	Date of transfer.
		<i>Square ft.</i>	
309c	Harvard Street and Lanier Place NW	1,257.15	July 11, 1916
309b	Harvard and Eighteenth Streets NW	314.13	Do.
Judiciary	At northwest corner of park, Fifth and G Streets NW	25.00	Sept. 6, 1916
15c	Center parking, Maryland Avenue, Fifteenth and H Streets NE	480.00	Nov. 27, 1916
22	Pennsylvania Avenue, Twenty-eighth and M Streets NW	756.00	Jan. 3, 1917
326	High Service Reservoir Park, Wisconsin Avenue and E Street NW ..	615.00	Apr. 30, 1917

IMPROVEMENT OF PARKS.

The following is a brief summary of the principal improvements that have been carried out in the parks during the fiscal year. They are described in detail in the pages that follow.

Part of the \$30,000 appropriated "for improvement, care, and maintenance of various reservations" was devoted to making improvements in three unimproved reservations (Nos. 235, 318, and 319) and making additional improvements in four partially improved reservations (Nos. 28, 29, 37a, and 37b). The upper retaining wall on the west side of Meridian Hill Park was completed by building the superstructure and the upper entrance to the park was about one-half completed. A double park lodge was built in Montrose Park. Extensive improvements were made in Rawlins Park, the entire park being redesigned. Additional improvements were made in East Potomac Park, West Potomac Park, and the Monument Grounds. Much additional planting was done, the following material having been set out:

Deciduous trees, 2,132; evergreen trees, 1,016; deciduous shrubs, 6,223; evergreen shrubs, 2,146; perennials, 3,683; vines, 200; and rose bushes, 44.

MAINTENANCE OF IMPROVED PARKS.

The improved parks and park spaces were maintained in good condition during the year. The work consisted generally in repairing worn places in the oiled and tarred roads; sweeping paved roads and walks; repairing and raking gravel walks and keeping them free of weed growth; cleaning gutters and drain traps; mowing and raking lawns, edging their borders, sodding or seeding bare places; removing dead trees; pruning trees and shrubs; trimming hedges; planting and caring for flower beds; setting, repairing, and painting trespass fences; washing and staking park benches; repairing board walks; and relaying brick gutters. Deadwood was cut out from trees and the cavities thus formed were filled with cement. Trees and shrubs were sprayed to prevent defoliation by insects.

In November, December, and January stable manure was spread over lawn surfaces, 3,441 cubic yards of the material being used for the purpose. This was raked in the spring.

The snow was promptly removed from the park walks and the sidewalks around them and sand was spread over ice and frozen snow that could not be readily removed. In December and January 205,000 square yards of walks were cleaned three times, and in February the same area was cleaned.

In the autumn some of the flower beds were planted with pansy plants and some with flowering bulbs for early spring bloom; these beds were then covered with a coating of well-rotted manure. In these plantings 25,000 pansies and 57,600 bulbs were used. In May and June the beds were planted with 616,000 bedding plants. These beds were protected in most cases by hooped irons placed around them. Ten vases were stocked with plants for summer decoration.

The special efforts made by this office during recent years to renew the bare places and worn borders on the lawns by resodding have been continued during the year, greatly improving the appearance of the parks.

In addition to the general work referred to above, the following special work was done:

NORTHWEST DIVISION.

Dupont Circle.—In a shrubbery bed which was prepared last year there were planted 340 perennial plants for replacements and to thicken up places that did not present a finished appearance. In addition to this bed, 40 evergreen trees, 271 evergreen shrubs, 11 deciduous shrubs, and 150 herbaceous perennials were planted in the circle. Repairs were made to the asphalt walks, the area resurfaced being 60 square yards.

Farragut Park.—The asphalt walks were repaired over an area of 180 square yards.

Franklin Park.—Nine evergreen shrubs and 38 deciduous shrubs were planted. Repairs were made to the asphalt walks over an area of 100 square yards.

Iowa Circle.—Two hundred ivy plants were planted. Repairs were made to 175 square yards of the asphalt walks.

Judiciary Park.—Repairs were made to the asphalt roadways, the area resurfaced being 290 square yards; 475 herbaceous perennial plants were planted.

Lafayette Park.—Two shrubbery beds, with an area of 118 square yards, were remodeled.

McPherson Park.—Twenty-five evergreen shrubs were planted. Repairs were made to 60 square yards of the asphalt walk.

Meridian Hill Park.—The superstructure of the upper retaining wall on the Sixteenth Street side of this park which could not be finished during the previous fiscal year for lack of funds was completed during the first part of the present fiscal year under a contract with the same contractors who built the remaining portion of the wall. The plan for this upper retaining wall contemplates the construction of two entrances through which the upper plateau of the park can be reached from Sixteenth Street. One of these entrances will be at the northern end of the wall and the other at the southern end. Work for beginning the construction of the north entrance was commenced during the present fiscal year, there not being sufficient funds available for building the entire entrance. The work completed during the year for this entrance consists of an exedra approach to the foot of a flight of steps within an inclosing concrete structure, the façade of which consists of an archway of simple architectural treatment constructed of cast concrete showing exposed aggregate surface texture. Within the inclosing structure, which is roofed, there is an intermediate platform at the foot of an open-air

stairway, not yet constructed, leading to the upper level of the park. This work was done under contract and it is hoped to complete the entrance during the next fiscal year.

Montrose Park.—The summer house was painted. A plant bed was made and planted with 60 evergreen shrubs. Five hundred and fifteen evergreen shrubs were planted throughout the park. A double park lodge was constructed under contract. Bone meal was spread around the trees and shrubs in April. Forty-four rose bushes were planted.

Mount Vernon Park.—One hundred and twenty-four evergreen shrubs were planted.

Presidents' Park (White Lot).—This park extends from the White House grounds south to B Street north, between Fifteenth and Seventeenth Streets west. Twelve old trees were removed and 122 deciduous trees and 158 deciduous shrubs were planted; 805 feet of 2-inch and 3-inch water pipe was laid for use in watering trees and shrubbery; 333 square yards of sod was laid along border of walk; 7,345 square yards of macadam roadway was treated with tar and covered with trap-rock screenings. The asphalt roadway entering the grounds from Seventeenth Street and New York Avenue was repaired, the area resurfaced amounting to 50 square yards.

Rawlins Park.—This park has been entirely redesigned, the work of remodeling being commenced in October, 1916. The entire area was regraded and sown in grass seed; the two old display fountains were removed, the iron post-and-chain fence inclosing the park taken down, and the old asphalt walk taken up. New drainpipe was laid and new drain traps built; cement footwalks on the direct lines of travel and a gravel walk around the border of the park were constructed; a cement coping built around the outside boundary of the park and a set of concrete steps built on the north side at the center to connect the park walk with the public sidewalk, which is above the grade of the park. The 12 gas lamps were removed from the outside edge of the park and reerected in the interior and two additional lamps were installed. Under the authority granted the Chief of Engineers by public resolution No. 18, Sixty-fourth Congress, approved May 18, 1916, permission has been granted to the American Society of Civil Engineers to erect in this park a memorial fountain to Alfred Noble, a civil engineer of distinguished ability in connection with Government work. A full-size model in plaster of this fountain has been placed in the center of the park, where it will remain until the marble fountain is completed and ready to be set in position.

Truxton Circle.—The cement walk was covered with tar and sand. One evergreen tree, one evergreen shrub, and one deciduous shrub were planted. Two hundred Iris plants along the borders were taken up and removed and the space occupied by them was sodded.

Washington Circle.—Six evergreen trees were planted, the woodwork and the roof of the watchman's lodge were painted with two coats of paint, and broken glass in the windows replaced with new glass and frosted. Repairs were made to the asphalt walks, the area resurfaced amounting to 260 square yards.

Reservation 23, Pennsylvania Avenue, Twenty-first and I Streets NW.—This space was entirely redesigned. The entire area was regraded, soiled, and seeded, a new walk system and new planting being introduced. In doing this the following was accomplished: 276

square yards of cement walks and 62 linear feet of cement coping were constructed, 100 linear feet of 6-inch drain pipe and 55 linear feet of 2-inch water pipe run. Shrubby beds were constructed. The walk was afterwards treated with tar and sand; 108 square yards of sod was laid and 90 evergreen shrubs and 150 deciduous shrubs were planted.

Reservation 29, Pennsylvania Avenue, Twenty-first and I Streets NW.—This reservation was also newly designed, the entire area being regraded, soiled, and seeded, and a new walk and planting system introduced. In doing this 170 square yards of cement walks and 60 linear feet of cement coping were constructed, 114 linear feet of 6-inch drain pipe and 160 linear feet of 1½-inch water pipe were laid, shrubby beds constructed and filled with good soil, and 82 evergreen shrubs and 130 deciduous shrubs planted. In June the cement walk was treated with tar and sand.

Reservation 30, Pennsylvania Avenue, Eighteenth and H Streets NW.—Repairs were made to the asphalt walks, the area resurfaced amounting to 50 square yards.

Reservation 33, Pennsylvania Avenue, Thirteenth and E Streets NW.—The shrubby beds were completely repaired, the beds being resoiled and planted with 330 evergreen shrubs and 30 deciduous shrubs; 345 evergreen shrubs were planted around the statue of Gen. Pulaski; 39 linear feet of water pipe was laid to connect the drinking fountain with supply.

Reservation 36, Pennsylvania Avenue, Seventh and C Streets NW.—Eight evergreen trees were planted and 63 evergreen shrubs were placed around the statue of Gen. Hancock.

Reservation 57c, Decatur, Twenty-second and S Streets NW.—Thirty-six deciduous shrubs were planted.

Reservation 58, Massachusetts Avenue and Twenty-first and Q Streets NW.—Twenty deciduous shrubs were planted.

Reservation 62, Massachusetts Avenue and N Street between Sixteenth and Seventeenth Streets NW.—The clay was removed from the parking space between the sidewalk and street curb and replaced with soil and leaf mold and the space planted with 700 evergreen trees and 30 evergreen shrubs. Six deciduous shrubs were also planted.

Reservation 64, Massachusetts Avenue and N Street between Fifteenth and Sixteenth Streets NW.—Fresh soil and leaf mold were placed in 60 square yards of shrubby bed and 30 evergreen shrubs planted. One deciduous tree was planted.

Reservation 65a (Highland Terrace) Massachusetts Avenue between Fourteenth and Fifteenth Streets NW.—A trench was opened, filled with soil, and 500 perennial plants planted.

Reservation 150, Connecticut Avenue, Eighteenth and M Streets NW.—Two hundred herbaceous perennial plants were planted.

Reservation 155, Rhode Island Avenue, Tenth and Q Streets NW.—Twenty deciduous shrubs were planted.

Reservation 156, Rhode Island Avenue, Tenth and Q Streets NW.—Eight deciduous shrubs and 2 evergreen shrubs were planted.

Reservation 157, Rhode Island Avenue, Ninth and Q Streets NW.—One deciduous shrub and 3 evergreen shrubs were planted.

Reservation 179, New York Avenue, Third and M Streets NW.—Tar was spread over 107 square yards of walk surface, which was then covered with sand.

Reservation 318, Georgia Avenue, Ninth and Upshur Streets NW., Petworth.—The reservation was highly improved. It was inclosed with an 8-inch cement coping, 640 feet in length, a cement footwalk covering an area of 172 square yards constructed, 150 feet of 1½-inch water pipe laid and connected with supply, 397 square yards of sod laid, beds for shrubbery and plants made, and 68 evergreen shrubs, 87 deciduous shrubs, and 24 perennial plants planted. In June tar was applied to the walk and covered with sand.

Reservation 319, New Hampshire Avenue, Seventh, and Taylor Streets NW., Petworth.—This reservation was also highly improved. It was inclosed with an 8-inch cement coping, 545 feet in length, a cement footwalk covering an area of 158 square yards was constructed and covered with tar and sand, 325 square yards of sod laid, 150 feet of 1½-inch water pipe introduced and connected with supply, shrubbery and plant beds constructed, and 72 evergreen shrubs, 60 deciduous shrubs, and 24 perennial plants planted.

Reservation 325 (High-Service Reservoir Park), Wisconsin Avenue and R Street NW.—A contract was entered into on June 15, 1917, for constructing new cement walks, coping, and steps and stone walls at this reservation. Under this the contractor commenced work on June 21 and completed the minor excavation for the cement steps and coping. Water service was introduced by this office by laying 21 feet of 1-inch lead pipe and 27 feet of 1½-inch galvanized-iron pipe.

Reservation 328, Massachusetts Avenue, Thirty-fifth, and Fulton Streets NW.—Three evergreen trees were planted.

SOUTHWEST DIVISION.

Henry Park.—Two hundred and fifteen feet of 6-inch terra-cotta pipe was laid to drain the drain traps along the embankment on the east side. Some old diseased trees were removed.

Seaton Park.—Work was continued for raising low portions of these grounds. In July, 1916, 4,592 loads of clay, which was hauled in without expense to the Government, was used in grading; 43 deciduous trees were planted. All exterior woodwork and the roof of the watchman's lodge house was given two coats of paint. Some old diseased trees were removed.

Smithsonian Grounds.—The old paint on the watchman's lodge house was scraped off and the house given three coats of paint. A footwalk on the Ninth Street side of the park was treated with tar and sand over an area of 333 square yards.

Willow Tree Park.—A concrete wading pool for use of the children was constructed.

EAST DIVISION.

Folger Park.—Repairs were made to the asphalt walk, the area resurfaced amounting to 130 square yards.

Fort Davis and Fort Dupont.—These are located in the extreme southeastern section of the city. They were purchased by the Commissioners of the District of Columbia under the District of Columbia appropriation act for the fiscal year 1913, approved June 26, 1912,

which provided for their acquirement for park purposes and for the preservation of the sites of the forts. The act stated that when acquired they should become a part of the park system of the District of Columbia under the control of the Chief of Engineers. By letter of November 17, 1916, they were placed by the commissioners under the jurisdiction of the Chief of Engineers, who accepted them by letter of January 3, 1917. Fort Davis contains 13.33 acres and has been numbered reservation 336. Fort Dupont contains 16.55 acres and has been numbered reservation 337. They are located on Alabama Avenue (old Bowen Road), Fort Davis being at Pennsylvania Avenue, Thirty-eighth and T Streets SE., and Fort Dupont at Alabama Avenue and Forty-second Street SE., about three-fourths of a mile from Pennsylvania Avenue. Their elevation provides a magnificent view of the city to the northwest. The grade of Fort Davis is from 6 to 8 feet above grade at the intersection of Pennsylvania and Alabama Avenues in the front and falls off quite abruptly to the northwest in the rear. There is a grove of deciduous trees along the rear. The front is clear and has been used for truck gardens and lawns about the houses of the former owners. The grade of Fort Dupont in the front is about that of Alabama Avenue and is level for a distance of about 500 feet back, where the grade changes abruptly and falls off to the northwest. The front part of the area is covered with deciduous trees of medium size and there is a cleared area between this grove and the brow of the hill. There are very few houses in the neighborhood of either tract, and it will be a great many years before it will be necessary to develop the areas as parks. At present they would only serve as recreation grounds for automobile parties, as there are no car lines within walking distance of either. There are houses on both tracts and these are rented to the former occupants, the rentals being collected by this office and deposited in the Treasury.

Garfield Park.—A shrubbery bed covering an area of 215 square yards was constructed and planted with 600 perennial plants. Seven deciduous trees were also planted.

Lincoln Park.—Tar and sand were applied to 1,360 square yards of footwalk.

Maryland Avenue center parking.—Eleven deciduous trees were planted. The east 40 feet of this parking at Maryland Avenue, Fifteenth and H Streets NE. was transferred to the Commissioners of the District of Columbia on November 27, 1916, in order to provide a roadway on the west side of a public comfort station to be erected at that point by the commissioners.

Pennsylvania Avenue center parking.—Operations for the planting of this center parking were continued, trenches being opened in that portion between Second and Fourth Streets and 93 evergreen shrubs and 3,670 deciduous shrubs were planted to form a hedge along the parking; 200 vines were also planted. In April 5 tons of bone meal were used for mulching trees. About one-third of this parking has now been improved.

Stanton Park.—Repairs were made to the asphalt walks, the area resurfaced being 60 square yards.

Union Station Plaza.—Necessary repairs were made to the armature of the electric motor which operates the pump for the Columbus Memorial Fountain in the center of the plaza.

Reservation 126, Virginia Avenue and L Street between Ninth and Eleventh Streets SE.—Five deciduous trees were planted.

Reservation 232, North Carolina Avenue, Eighth and B Streets NE.—Three evergreen trees were planted.

Reservation 235, North Carolina Avenue and A between Thirteenth and Fourteenth Streets NE.—Extensive improvements were made here. An 8-inch cement coping 455 feet in length was constructed around the reservation and a cement walk covering an area of 77 square yards laid. The lawn surface was prepared and sown with grass seed and the borders sodded, using 88 square yards of sod. Clay was removed from areas designed for shrubbery beds and replaced with good soil. Twenty-five evergreen shrubs and 149 deciduous shrubs were planted. In June, 1917, the cement walk was treated with tar and sand.

WATER PIPES, DRAINPIPES, AND FOUNTAINS.

Repairs were made to water pipes and valves where necessary and new valves put in. In the autumn the water was shut off from the various parks and the hose valves removed and taken to the shops at the nursery and repaired during the winter. In the spring the valves were replaced and the water turned on. During the year 3,266 feet of galvanized-iron water pipe and 21 feet of lead pipe was laid.

Stoppages were removed from drainpipes and repairs made to broken pipes as required. Sixty-seven hundred and ninety-seven feet of terra-cotta draintile and 1,450 feet of terra-cotta pipe was laid and four drain traps constructed.

The fountains were given regular attention and repairs made to supply pipes, waste pipes, and valves. The display fountains and their jets were cleaned weekly, except in winter, when the jets were removed and stored until spring. One sanitary drinking fountain was installed in each of Judiciary Park, Henry Park, the Smithsonian Grounds, and West Potomac Park.

Repairs were made to the drinking fountains, and five hydrants were installed to furnish drinking water. The water was turned off from all the fountains during the winter.

LIGHTING THE PUBLIC GROUNDS.

The gas and electric lighting service in the public grounds was maintained in effective order by the lighting companies. Not many outages were reported, and whenever these occurred a proper deduction was made from the amounts due. One gas lamp-post and lamp was erected at the Fourth Street entrance to the F Street roadway through Judiciary Park. One gas lamp-post and lamp in the Smithsonian Grounds near Twelfth Street SW., which interfered with the construction of the tunnel of the central heating, lighting, and power plant, was taken down. It will be replaced as soon as the tunnel is completed. The 12 gas lamp-posts and lamps on the sidewalk around Rawlins Park were taken down and reerected in the interior of the park after these grounds were remodeled and improved, and two additional lamps were installed there. A decided improvement in

the lighting of those parks which are illuminated by gas was made by replacing all of the Boulevard-type lanterns with round globes of a newer and better design. These not only add to the appearance of the posts but also afford better light. This change was made by the lighting company without extra charge. Two 100-candlepower electric lamps and posts were installed at the Fifteenth and E Street entrance to the Presidents' Park (White Lot). By permission of this office the Commissioners of the District of Columbia erected a gas lamp and post at the east end of triangular reservation 57b at Massachusetts Avenue, Twenty-third, and R Streets NW., for the purpose of lighting the roadway at the north side of Sheridan Circle. This lamp will be lighted and maintained by the District Government.

ROADS, WALKS, AND COPING.

Roads.—Bituminous-bound macadam roads in the Monument Grounds, Presidents' Park, and East and West Potomac Parks were resurfaced over an area of 100,021 square yards at an average cost of 3.9 cents per square yard. The attached table shows the cost of this resurfacing.

Walks.—Fifty-five hundred and thirty-seven square yards of cement walk, 332 linear feet of concrete steps, and 511 square yards of gravel walk was constructed. Three hundred and five square yards of asphalt roadway and 1,365 square yards of asphalt footwalks were resurfaced and 3,103 square yards of cement walk was given a coating of tar and sand.

Cost of resurfacing macadam roads.

	Materials.		Quantities.		Area.	Length.
	Bitumen.	Surface metal.	Bitumen.	Surface metal.		
			Gallons.	Cu. yds.	Sq. yds.	Feet.
Monument Grounds.....	Coal-tar pitch.	Torpedo sand.	3,500	106	27,043	6,273
White Lot (Presidents' Park).....	do.	do.	1,000	26	7,345	1,902
East Potomac Park.....	do.	do.	11,675	253	59,680	17,560
West Potomac Park.....	do.	Trap-rock screenings.	5,000	100	12,953	2,850
Total.....					100,021	28,585

	Area treated per gallon bitumen.	Area treated per cubic yard metal.	Cost of bitumen per square yard.	Cost of metal per square yard.	Cost of applying bitumen and spreading and rolling metal.	Total cost.
	Sq. yds.	Sq. yds.	Cents.	Cents.	Cents.	Cents.
Monument Grounds.....	7.72	250.4	1.1	0.6	0.8	2.5
White Lot (Presidents' Park).....	7.35	282.5	1.1	.6	.6	2.3
East Potomac Park.....	4.51	208.2	1.9	.7	.5	3.1
West Potomac Park.....	2.60	129.5	3.3	2.8	1.6	7.7

Cost of coal-tar pitch, 6 and 8½ cents per gallon; trap-rock screenings, \$3.70 per cubic yard; torpedo sand, \$1.60 per cubic yard.

Coping.—Twenty-nine hundred and thirty-three linear feet of cement coping was constructed around reservations.

OCCUPATION OF PUBLIC GROUND BY PRIVATE PARTIES.

On October 24, 1916, the licenses to the New York Avenue Presbyterian Church to occupy reservation 186, Ohio Avenue and C Streets between Thirteenth and Fourteenth Streets was renewed by the Chief of Engineers for a period of five years from November 1, 1916. There is a small wooden building located on the reservation, which is used by the licensee as a chapel for religious services.

On April 12, 1917, the Chief of Engineers executed a license to C. M. Mundie to use for a period of five years as a truck garden United States reservation 296, located between Water and One-half T, and U Streets SW.

On May 15, 1917, the Chief of Engineers executed a license to C. F. Dawson to use for a period of five years from May 16, 1917, as a truck garden United States reservation 297, located between Water, South Capitol, and R and S Streets SW.

MISCELLANEOUS.

Benches.—Park benches were repaired, cleaned, and painted and loose benches were refastened.

Compost grounds.—These grounds are in the unimproved part of Potomac Park, east of the railroad embankment, far from any dwelling house. The manure was regularly hauled from the War Department stables and piled here.

Fences.—Repairs were made to iron post-and-chain fences and loose posts straightened and reset.

Park lodges.—The plumbing in the lodges was looked after and kept in good order and the toilets were regularly cleaned.

CHILDREN'S PLAYGROUNDS.

Under the authority contained in the act of Congress approved March 3, 1903, permission was granted to the department of playgrounds of the District government by letter of July 12, 1916, to use for playground purposes during the six months ending December 31, 1916, the west end of reservation 126, at Virginia Avenue and Tenth Streets SE.; the southwest corner of Garfield Park; the western end of reservation 19, at Fifth Street, between K and L Streets SE.; and Willow Tree Park (reservation 201a), located in the interior of square 534, between Third and Four-and-a-half and B and C Streets SW. This permit was by letter of February 14, 1917, extended to June 30, 1917.

PARK WATCHMEN.

The preservation of law and order, the protection of the public in the parks, and the protection from injury of the grounds themselves are effected by the United States park police. This organization is maintained by the Federal Government and is under the immediate supervision of the officer in charge of public buildings and grounds.

The work performed by the United States park police is that of any city police force, except that its activities are confined in ordinary cases to matters arising within the parks of the city. In addition to the daily routine of police duty within the city parks it is this force which is called upon to handle the crowds of from 500 to 25,000 people that gather in the larger parks on the numerous special occasions that occur in Washington.

The park police is commanded by an officer of the United States Army, detailed from the line as assistant to the officer in charge of public buildings and grounds. The personnel, all of whom are appointed under the Civil Service Commission, consists of 1 first sergeant, 1 sergeant, and 43 privates of police (2 privates being "acting sergeants").

In performing their ordinary duties the men are divided into three reliefs, which are on duty from 8 a. m. to 4 p. m., from 4 p. m. to midnight, and from midnight to 8 a. m. The first two reliefs are equal in strength and comprise the major part of the force; the after midnight relief is too small for the amount of ground covered, but can not be increased because of the limited number of men on the force. In order to promote mobility and consequent efficiency, the first sergeant and one private are provided with motorcycles, while the sergeant and 41 privates are mounted on bicycles, one man only being a "foot man."

The standard of the personnel is very high, a strong physique, excellent character, a high degree of personal responsibility, and absolute efficiency being the prime requisites. Military discipline is maintained as far as it is applicable to a force of men not actually in the military or naval service, and no untidiness in appearance or laxity in the performance of duty is tolerated. This high standard is maintained through careful selection of men applying for original appointment and by a system of constant and rigorous inspection. The existence of a pride of organization among the men themselves tends to stimulate the members of the force at all times to present a smart appearance and to put forth their best efforts to serve the public and to protect the great number of lawns, trees, and flowers intrusted to their guardianship. In work accomplished a comparison of the summary given above with a similar report of the police force of any city will show conclusively that the United States park police have accomplished much.

The following table shows the character of police duty performed by the park watchmen during the past year:

Nature of offense.	Disposition of cases.										
	Number of arrests.	Fined.	Forfeited collateral.	Sent to workhouse.	Personal bonds taken.	Dismissed.	Nolle prossed.	Probation.	Inmate asylum.	Settled out of court.	Held for action of grand jury.
Drunkenness.....	315	86	89	99	37	2	1	1			
Violation traffic regulations.....	137	11	107	1	15	1	1				
Disorderly conduct.....	103	34	43	10	10	3	1	2			
Vagrancy.....	14		1	11	1			1			
Violation park regulations.....	26	2	13		10			1			
Violation police regulations.....	11	2	7		1	1					
Unlawful assembly.....	6		3		1	1	1	1			
Assault.....	8	2	2	2	1	1					
Violating excise law.....	33	8	9	7	8			1			
Concealed weapons.....	2				1		1				
Fornication.....	5		3	2							
Insanity.....	5								5		
Petty larceny.....	8		3	2	1		1				
Colliding.....	15	3	3		3	1					
Threats.....	3			2		1					
Indecent exposure.....	16	8	6	2						4	
Grand larceny.....	2										2
Assault.....	1							1			
Violation national defense act.....	1				1						
Defacing Government property.....	4	1	1					2			
Robbery.....	1									1	
Indecent assault.....	1					1					
Total.....	717	157	290	138	87	13	7	10	5	4	3
									1	2	
											717

RECORD OF FINES.

Total amount of collateral forfeited.....	\$2,620.00
Total amount of fines imposed.....	2,329.00
Total amount fines and collateral forfeited.....	4,949.00

MISCELLANEOUS.

Number of sick or injured sent to hospital.....	66
Children taken to parents for correction.....	24
Lost children taken to police stations.....	4
Infants picked up and sent to morgue.....	2
Body recovered from river and sent to morgue.....	1
Suicide sent to morgue.....	1
Killed by street car and sent to morgue.....	1
Sick in park, taken home.....	1

Efforts to secure sorely needed improvements in the United States park police have been made by representation to Congress and by recommendations in previous annual reports. Unfortunately these efforts have, in the main, been unsuccessful. It is sincerely hoped that the following recommendations, most of which are reiterations of those made formerly, may receive favorable consideration:

1. That the annual salary of the first sergeant be increased by \$60.

This position at present carries the pay of \$950 per year, plus the temporary 10 per cent increase authorized by the legislative act for 1918. This is not enough to retain the services of the high type of man needed. The pay of a sergeant of the Metropolitan police is \$1,400 per year.

2. That the two acting sergeants be appointed sergeants and receive pay corresponding to their rank and that this annual pay be increased by \$50. (Present rate of pay is \$900 per year.)

To carry on the work of the United States park police properly, it has been found that three sergeants, in addition to the first sergeant, constitute the minimum noncommissioned personnel possible. The expedient of appointing one private as acting sergeant was adopted April 2, 1906, and on June 22, 1911, a second private was made acting sergeant; these two men have since been performing the more important, arduous, and responsible duties of sergeant while receiving privates' pay, an arrangement which works injustice and hardship.

3. That the United States park police be increased by eight privates.

The maximum force on duty at any time from 8 a. m. to midnight is 19 privates. The area covered, aside from the outlying small reservations, is 1,062 acres comprised in 23 parks. There is one post or "beat" of 4.5 miles of roadway, one of 3.7 miles of roadway, and one of 3.6 miles. These figures show how inadequate is the size of the force for the work in hand.

4. It is recommended that a pension fund similar to that now authorized for the Metropolitan police be established for the park police. It is provided by act of Congress that money accruing from fines and forfeited collateral is appropriated to the Metropolitan police force as a pension fund. The fines resulting from the arrests made by the park police should be segregated and carried into a separate fund for temporary assistance for policemen who may be temporarily disabled on duty or who may be sick, administered in the same manner as the present Metropolitan police fund.

The duties of the United States park police are practically identical with those of the Metropolitan police and yet the fines resulting from the work of the park police (\$4,949 this year) are paid over to benefit another police force which had nothing whatever to do with the making of the arrests which resulted in the collection of this money, and which is a force with which the park police is not in any way connected. The continuance of this condition is most disheartening and it is hoped that Congress may see fit to remedy the matter.

5. That the designation "park watchmen" be changed to "park police." As evidenced by the table of arrests above, the duties of the park watchmen are essentially those of policemen. The name "park watchmen" was given them when their duties were largely those of park keepers. In view of the change in their status and the effect which the designation "policeman" would have in their dealings with the public, it is recommended that they be designated as "park police."

BAND CONCERTS.

These concerts were scheduled to be given by the United States Marine Band and the Engineer Band, weather permitting, on Mondays, Tuesdays, Thursdays, and Fridays, between 7.30 and 9 p. m., in the following-named parks from July 1 to September 30, 1916, and on Tuesdays and Thursdays in June, 1917, the only band available for the latter month being the United States Marine Band.

Dupont Circle.—July 10, August 3, 31, 1916.
Franklin Park.—July 31, September 18, 29, 1916.
Garfield Park.—July 14, August 11, September 12, 1916, June 21, 1917.
Iowa Circle.—July 20, August 8, September 11, 1916, June 25, 1917.
Judiciary Park.—July 7, 17, 28, August 7, 18, 25, September 15, 28, 1916.
Lincoln Park.—July 3, 25, August 4, 22, September 5, 22, 1916, June 12, 1917.
Logan Park (Anacostia, D. C.).—July 11, August 1, 17, September 8, 1916.
McMillan Park.—July 21, August 10, September 1, 1916; June 19, 1917.
Montrose Park.—July 24, August 21, 28, September 14, 25, 1916.
Smithsonian Grounds.—July 18, 27, August 14, 24, September 7, 19, 26, 1916.
Reservation 319 (New Hampshire Avenue, Seventh and Taylor Streets, Petworth).—August 29, 1916; June 23, 1917.
Washington Circle.—July 13, August 15, September 21, 1916.

In addition to the concerts mentioned above, the usual Wednesday afternoon concerts in the Capitol Grounds were given by the Marine Band from July to September 30, 1916, and in June, 1917. That band also gave concerts in the inclosed grounds of the White House on Saturday afternoons in July, August, and September, 1916, and on the ellipse south of the White House on Easter Monday, April 9, and in June, 1917. The Marine Band also gave concerts at the new band stand in Potomac Park on Wednesday and Saturday afternoons during the month of May, 1917.

EXTENSION OF BUILDINGS BEYOND THE BUILDING LINE.

No permits for extensions of this character were referred by the War Department during the year for the action of this office.

3. POTOMAC PARK AND MONUMENT GROUNDS.

Maintenance of improved portion of West Potomac Park.—Two sections of the roadway, which was reconstructed last year, were given a surface treatment of coal-tar pitch and trap-rock screenings. The total area of the roadway treated was 12,953 square yards. The total unit cost of this resurfacing was 7.7 cents per square yard. The flower beds around the fountain at the north end of the Highway Bridge, were rearranged and cinder walks were built. A border planting of shrubbery was also carried out. The following work was accomplished: 745 cubic yards of bed was excavated and prepared with soil and manure, 271 deciduous trees and shrubs were transplanted here from the shore of the Tidal Basin, 4,472 square yards of ground was graded and seeded, and 1,442 square yards of sod was laid. A septic tank was constructed at the boathouse, near the Paul Jones Memorial, to prevent the pollution of the waters of the Tidal Basin from the toilets in this house. The planting along the shores of the Tidal Basin was thinned out and the material taken out was used to improve other parts of Potomac and other parks. Miscellaneous planting was done in various parts of the park; 57 evergreens, 35 deciduous trees, and 93 shrubs were planted in this work. The drainage ditch in the interior of this park was maintained free of slides and other obstructions.

Improvement of interior portion of West Potomac Park.—The old lock house, which was moved to a new location during the fiscal year of 1916, was remodeled throughout. The first floor was partitioned so as to provide a public comfort station and a bicycle room. The second floor was fitted with lockers for the use of the park watch-

men. In remodeling this building special care was taken to restore it to its original design as nearly as possible. Two new stone chimneys were built and a new roof placed on the house. A new concrete walk 8 feet wide and 4,000 feet long with tarred surface was constructed along the south side of B Street from Seventeenth Street to the Potomac River. This walk was built on the line of the old bridle path and therefore necessitated the construction of a new bridle path 5,700 feet long and 10 feet wide, between the tennis court inclosures and the north Lincoln Driveway. The evergreen planting in the center parking on B Street was removed and a deciduous planting of a more satisfactory growing stock was planted. The large triangular area on the north side of B Street between Twenty-third and Twenty-sixth Streets was planted with a mass planting of mixed evergreen and deciduous trees. Seven hundred and five tree holes were prepared, and 450 deciduous and 255 evergreen trees were planted. The diagonal roadway leading to the Lincoln Memorial from the intersection of Virginia Avenue and New York Avenue was staked out between B Street and the Lincoln Memorial and cleared of all trees and shrubs. The grade of this road will be considerably higher than the present surface of the park so that fill is now being received along the line of this road free of cost to the United States Government. Many other improvements were made throughout this portion of the park, the following work being done in connection therewith:

Ground graded, square yards.....	13, 754
Sod laid, square yards.....	4, 680
Old trees removed.....	578
Trees planted.....	308
Drain tile laid, linear feet.....	2, 902
Concrete walk constructed, square yards.....	3, 555
Bridle path constructed, square yards.....	6, 333

An appropriation of \$15,000 was made in the sundry civil act for the fiscal year ending June 30, 1917, for moving out the sea wall on the river side of West Potomac Park. The execution of this work was placed by the Chief of Engineers in the hands of the engineer officer in charge of the improvement of the Potomac River, who reports the following work accomplished: During September, 290 linear feet of masonry sea wall was constructed on foundation previously laid, under appropriation for improving Potomac River at Washington, D. C., making a total length of 1,110 feet of new masonry sea wall, 910 feet having been constructed under that appropriation. During the same month a trench 2,000 feet long, 45 feet wide, and 7 feet deep was dug by the U. S. derrick boat *Atlas*. This trench was made for receiving the riprap foundation. The replacement of riprap foundation for the extension of new masonry sea wall was begun on October 26, 1916, was suspended for the winter, was resumed on March 7, 1917, and was completed (exhaustion of funds) on April 19, 1917. Resulting from the work, about 1,000 linear feet of foundation was completed by the placement of 6,620 cubic yards of riprap stone.

Care and improvement of East Potomac Park.—Eighty-eight acres of this park was cleared of weeds and small scrub willows, and plowed. About 30 acres was harrowed, seeded, and rolled in the fall, and in the spring the ground was again plowed in. This entire area

of 88 acres was then planted in corn by the Boy Scouts, who were granted permission by this office to cultivate this area; 4,000 square yards of gutter was repaired, and 1,845 perennials were planted. The strip of land lying between the roadway and sea wall along the Washington Channel was graded over an area of about 20,000 square yards; 5,317 cubic yards of soil was hauled from the interior of the park to do this work. The entire roadway around this park was surface treated with a coat of coal-tar pitch and torpedo sand. This work amounted to 52,680 square yards and cost 3.1 cents per square yard. It is suggested that the Tidal Basin in West Potomac Park be named "Twining Lake," and that the extreme southern point of East Potomac Park be named "Hains Point." The plan for providing the Tidal Basin as a means of flushing the Washington Channel was originated by Maj. Twining, of the Corps of Engineers, while its execution was carried out by Col. Hains, of the same corps.

A contract was entered into on June 19, 1917, for constructing the end wings with porches and colonnades of a field house in this park.

Monument Grounds.—The planting in the center parking on B Street was rearranged and a new type of planting material substituted for the old planting of rhododendrons. The following work was accomplished in making this change: 1,543 deciduous shrubs were planted, 783 square yards of sod border was laid, and 61 square yards of cement walk was constructed; 27,043 square yards of roadway in this park was given a surface treatment of coal-tar pitch and torpedo sand. The total unit cost for this work was 2.5 cents per square yard.

A national sylvan theater was constructed in these grounds in accordance with the approved plan, southeast of the Washington Monument at the foot of the hillside. The filling material used to construct the stage, which is 5 feet above grade, 80 feet wide, and 80 feet deep, together with 2 wings each 30 feet square, was hauled in free of cost to the United States Government. The stage was provided with three flights of flag steps, which give access to the wings from the lower ground level in the rear. A special electric cable was laid to provide current for a series of larger projector lamps, which when placed on platforms furnish light for the performances. The wings of the stage are screened with a heavy planting of forsythia and other shrubbery, which were transplanted from the shores of the Tidal Basin into well-prepared beds along the sides of the stage. The entire area of the theater stage was covered with soil and seeded and sodded to insure a good turf for the opening performance which took place on June 2. The following work was accomplished in the construction of the theater: One thousand one hundred and eighty cubic yards of rough clay fill was made, 350 square yards of shrubbery bed was prepared, 800 square yards of lawn was graded and sodded, 900 square yards of lawn was graded and seeded, 50 linear feet of 8-inch and 340 linear feet of 6-inch terra-cotta sewer pipe was laid, 285 linear feet of flagstone steps were constructed, and 428 deciduous trees and shrubs were transplanted to the theater.

PREPARING GROUND IN PARKS FOR OUTDOOR SPORTS.

The sundry civil act for the fiscal year ending June 30, 1917, appropriated \$10,000 for "placing and maintaining special portions

of the parks in condition for outdoor sports." Under this, the following work was done:

The tennis courts, Nos. 1 to 10, in Potomac Park near Seventeenth and B Streets NW., were reconstructed into 14 courts and placed in two inclosures with 7 courts in each. This remodeling was carried out in accordance with the approved plan for the development of this park. There is a total playing area of 9,900 square yards in the two inclosures. In completing the remodeling of these courts the following work was accomplished: Two thousand and seventy-six linear feet of back-stop fence 10 feet high was built; 3,895 linear feet of 3-inch agricultural drain tile, and 1,500 linear feet of 1½-inch and 2-inch wrought-iron water pipe were laid; 9,900 square yards of cinders were placed as a drainage bed 6 inches deep and rolled to a true grade; and 9,900 square yards of clay 4 inches thick was graded over the cinders and well rolled to form the playing surface; 28 net posts were set and 4 drinking fountains were installed. A cinder walk, having an area of 1,100 square yards, was constructed as an entrance to the courts, and 2,418 square yards of lawn area along the walk was graded and seeded.

Three additional tennis courts were constructed in a separate inclosure in Henry Park on the site of the old station of the Pennsylvania Railroad. These new courts contain an area of about 1,500 square yards. During their construction the following work was accomplished: One thousand five hundred square yards of ground was graded, rolled, and covered with a 6-inch layer of cinders, and then covered with a 4-inch layer of good clay; this clay was thoroughly rolled and brought to a true grade for the playing surface; six net posts were set, and 464 linear feet of back-stop fence 10 feet high was erected; a drinking fountain was installed and 200 feet of 1½-inch wrought-iron water pipe and 200 feet of 6-inch terra-cotta sewer pipe were laid.

There are now in use 13 baseball diamonds, 42 tennis courts, 1 croquet court, 1 practice golf course, 1 hockey field, 2 polo fields, 1 soccer ball field, 1 cricket field, 1 hurling field, 1 pole vault and high jump, and 1 broad jump. These facilities were all maintained in good playing condition during suitable weather throughout their respective playing seasons. Base bags, pitchers' plates, and home plates were provided for baseball. Foul lines and playing lines were marked out daily on all diamonds, courts, and fields. Tennis nets were provided for all tennis courts. All grass was cut to proper height on the baseball grounds, golf course, polo fields, cricket field, etc.

The popularity of these recreational facilities is manifested by the large numbers of persons using them, notwithstanding the fact that on account of the war conditions many of those accustomed to do so have not been able to enjoy them this summer. This office has been glad to cooperate in every practicable way with the general desire to furnish means of interesting and beneficial entertainment for those connected with the military service of the country, particularly the soldiers. The grounds have been thrown open to their use with only such limited restrictions as are necessary for efficient administration.

During the month of June, 1917, the following special permits were issued: Tennis, Potomac Park, 779; tennis, Henry Park, 544; tennis,

Montrose Park, 65; tennis, Garfield Park, 19; golf, Potomac Park, 39; cricket, Potomac Park, 1 permit (used by Washington Cricket Club); croquet, Montrose Park, 3; baseball, 83. The use of the baseball diamonds was necessarily restricted by the difficulty in arranging teams of men who could be free from duty in sufficient numbers at the same time to engage in the games. During the last eight days in June 8,836 players used the tennis courts in Potomac and Henry Parks, though the courts were closed more than one-third of this time on account of wet weather.

Numerous permits have been issued during the spring and summer of 1917 to volunteer organizations to engage in military drill and training on the Ellipse in the President's Park and in other portions of the public grounds. Most of these organizations are composed of employees of the Government establishments, and one consists of women.

All of these figures show a very gratifying increase of appreciation of the service which this office is endeavoring by diligent effort to render to the public.

The card-index system maintained in this office, containing the names of all users of the tennis courts, is now in good working order, and has contributed largely to the success of the service.

An athletic meet participated in by the pupils of the Washington public schools was held in Potomac Park in the grounds south of the municipal bathing pools from May 28 to June 9 under permit granted by this office. The members of the Metropolitan police force were given the use of a baseball diamond during July and August to use in preparing for their field-day exercises to be held during the latter month. Permits were also issued for several children's festivals in the public grounds.

The facilities now provided under the current appropriation are not adequate to meet the demands made upon them. Sufficient equipment can not be procured, necessary construction work can not be carried on, and proper administrative forces can not be maintained. It is urgently recommended that additional funds be provided for these purposes.

RESERVATIONS USED FOR INAUGURAL PURPOSES, 1917.

By joint resolution approved February 9, 1917, the Secretary of War was authorized to grant permits to the committee on inaugural ceremonies for the use of any reservations or other public spaces in the city of Washington under his control on the occasion of the inauguration of the President-elect in March, 1917, provided that in his opinion no serious or permanent injuries would be thereby inflicted upon such reservation or public spaces or statutory thereon.

Under this authority permits were granted the committee to use the following spaces and reservations, which were occupied by the committee for the purposes specified in each case:

1. To erect a viewing stand on the sidewalk outside of the iron fence at the north front of the White House.
2. To occupy the southern border of Lafayette Park with the rear portion of a viewing stand erected on the public sidewalk.
3. To erect a viewing stand on United States Reservation No. 33, at Pennsylvania Avenue and Thirteenth and E Streets NW.
4. To erect a viewing stand each on United States Reservations Nos. 34 and 35, at Pennsylvania and Louisiana Avenues and Ninth and C Streets NW.

5. To occupy the northern portion of the Monument Grounds for a display of fireworks on the night of March 5, including the erection of temporary structures for storing fireworks, frames for displaying them, and seats for spectators.

To insure the repair of any damage to the reservations by this use of them, certified checks in approximate amounts were deposited by the inaugural committee with the officer in charge of public buildings and grounds.

There was considerable, and what appeared to be unnecessary, delay on the part of the committee in removing their stands after the inaugural ceremonies, but this was finally accomplished, and such slight damage as had been done to the turf and plantings was repaired and the reservations cleaned up by employees of the office of public buildings and grounds at the expense of the committee.

No serious or permanent injury was inflicted upon these reservations and public spaces or the statues thereon by this temporary occupancy. The guaranty checks were returned to the committee as soon as they had paid the expense incurred by this office in restoring the reservations.

PUBLIC GROUNDS USED FOR CONFEDERATE VETERANS' REUNION.

Section 5 of public resolution approved February 26, 1917, authorized the Secretary of War to grant permits to the citizens' executive committee for the entertainment of the Confederate Veterans' reunion for the use of any reservation or other public space in the city of Washington on the occasion of said reunion, which, in his opinion, would inflict no serious or permanent injuries upon such reservations or public spaces or statuary therein. Under this authority the committee was permitted to erect a stand on the sidewalk at the north front of the White House grounds for reviewing the parade of the veterans on June 7. This was promptly taken down after the ceremony. The committee was also granted permission to erect a temporary table on the parking of the Seventeenth Street side of the White Lot between C and D Streets NW., from which lunches were served to the veterans taking part in the parade.

4. CONNECTING PARKWAY BETWEEN POTOMAC PARK, THE ZOOLOGICAL PARK, AND ROCK CREEK PARK.

In sundry civil act for the fiscal year ending June 30, 1917, approved July 1, 1916, an appropriation of \$50,000 was provided to enable the commission to commence proceedings toward the acquisition of the Rock Creek and Potomac Parkway lands required for this connecting parkway. Negotiations have been in progress throughout the year with the owners of some of the property and a number of pieces have been acquired on very advantageous terms. Surveys were continued in portions of the parkway, the notes plotted and contours sketched. The sundry-civil act approved June 1, 1917, appropriated \$100,000 for continuing the acquirement of land and reappropriated the unexpended balance of the previous year's appropriation.

5. WASHINGTON NATIONAL MONUMENT.

The usual care was taken to protect the shaft and keep it clean. The stairways, landings, railings, waiting rooms, marble walls on top floor and on landings, and the tablets in the interior walls were swept or otherwise cleaned. All machinery connected with the ele-

vator was inspected, oiled, and cleaned each day before starting to carry passengers, and twice each week the safety appliances on the elevator car were tested, all by the employees at the Monument. In addition to this the elevator and all machinery connected with it were inspected once each month by an agent of the casualty company with whom a contract is in force for that service. The rooms in the power house and the lodge house were regularly cleaned and kept in good order. New radiators were installed in the waiting room of the lodge. New silver lettering and coat of arms were placed on the Michigan copper block in the interior walls replacing the old ones which had become worn and defaced. This restoration was done by the State of Michigan. The walls and ceiling in the custodian's office in the lodge house were scraped where necessary and given three coats of paint. The walls and ceiling in the motor room at the base of the Monument were cleaned and painted. At the power house the roof was repaired and painted; the walls, ceiling, and woodwork in the engine room were scraped and given two coats of paint; the walls in the toilet room were cleaned and painted; the stairway leading to the boiler room was varnished; all exterior woodwork was sandpapered and painted; and all galvanized ironwork was scraped and painted.

The following table shows the number of visitors to the top of the Monument each month and the total during the year:

Months.	Number by elevator.	Number by stairway.	Total.
1916.			
July.....	21,757	1,826	23,583
August.....	28,946	1,951	30,897
September.....	20,307	2,361	22,668
October.....	15,922	2,005	17,927
November.....	11,323	2,475	13,798
December.....	11,157	2,181	13,338
1917.			
January.....	8,977	1,114	10,091
February.....	8,299	1,300	9,599
March.....	11,760	8,208	19,968
April.....	12,321	5,522	17,843
May.....	13,043	3,192	16,235
June.....	21,082	8,477	29,559
Total.....	179,784	40,512	220,296
Total, 1909.....	136,019	33,791	169,810
Total, 1910.....	147,300	19,226	166,526
Total, 1911.....	140,800	19,859	160,749
Total, 1912.....	144,224	20,770	164,994
Total, 1913.....	158,431	30,258	188,689
Total, 1914.....	152,819	19,161	171,980
Total, 1915.....	156,640	25,368	182,008
Total, 1916.....	173,737	23,921	202,658
Yearly average, 1898-1908.....	103,901	50,958	155,859
Yearly average, 1898-1908.....	111,074	41,280	152,354

The Monument is open free to the public every week day from 9 a. m. to 4.30 p. m., and on Sundays and holidays from 12.30 to 4.30 p. m.

During the fiscal year there were 52 Sundays and 8 holidays, on which there were 39,883 visitors. Of these, 30,029 ascended in the elevator and 9,854 by the stairway. This gives an average of 665 persons on each of the 60 days.

6. STATUES AND THEIR PEDESTALS.

Attention has been given to all the completed statues during the year, and the pedestals and bronze figures have been maintained in a cleanly condition as far as possible.

7. PROPAGATING GARDENS, INCLUDING GREENHOUSES AND NURSERY.

The various greenhouse structures were maintained in as good condition as the small appropriation would permit, and the plants were given necessary care and attention.

All decayed woodwork in the houses was replaced and the repaired work painted. The flues of boilers were cleaned and put in good order and heating pipes, water pipes, and boilers repaired. A 60-gallon expansion tank was placed in the potting shed and connected with the heating system, tin flashing put around the roof of the building, and drainpipe laid to drain the down spouts therefrom. The work of replacing the large quantity of glass broken in these houses by hailstorm on June 10, 1916, was continued during the early part of the year until completed. The total number of plants propagated at the gardens was 692,007. Of these, 661,000 were used for the parks and reservations and the greenhouses and the nursery under the charge of this office, 11,600 for the Capitol, and about 14,350 for other departments of the Government. The surplus remaining (about 5,057) was distributed to Government and municipal offices, hospitals, public institutions, etc. The following list shows the stock grown, purchased, and distributed during the year:

Location.	Number.	Kinds.	Number of varieties.
Plants propagated and used for—			
Park planting.....	616,000	28	
Stock greenhouses, nursery and fall planting.....	45,000	15	
Grounds of Treasury Department.....	2,750	6	
Grounds of the State, War, and Navy Departments.....	5,900	13	
Grounds of United States Capitol.....	11,600	20	
Grounds of Interior Department.....	2,700	5	
Bureau of Engraving and Printing.....	3,000	12	
Pan American Union.....	300	(C)	(C)
No. 2, Engine Company, District of Columbia Fire Department.....	200	(C)	(C)
No. 12, Engine Company, District of Columbia Fire Department.....	200	(C)	(C)
Anacostia Citizens Association.....	250	(C)	(C)
Bureau of Standards.....	200	(C)	(C)
Casualty Hospital.....	200	(C)	(C)
Children's Country Home.....	300	(C)	(C)
Columbia Hospital.....	300	(C)	(C)
Corcoran Gallery of Art.....	200	(C)	(C)
Episcopal Eye, Ear, and Throat Hospital.....	200	(C)	(C)
Fruit and Flower Guild.....	800	(C)	(C)
Fort Washington.....	300	(C)	(C)
Garfield Hospital.....	200	(C)	(C)
Homeopathic Hospital.....	200	(C)	(C)
Home for Incurables.....	200	(C)	(C)
Industrial Home for Colored Children.....	200	(C)	(C)
Providence Hospital.....	200	(C)	(C)
Sibley Hospital.....	200	(C)	(C)
Tuberculosis Hospital.....	200	(C)	(C)
Walter Reed Hospital.....	307	(C)	(C)
Total.....	692,007		
PLANTS PURCHASED.			
Hardy flowering bulbs.....	57,600	7	1
PLANTED IN VARIOUS PARKS.			
Bulbs for spring bloom.....	57,600	7	1
Pansies for spring bloom.....	25,000		
Bedding plants for summer decorations.....	616,000	28	
Vases stocked for summer decorations.....	10		

¹ General stock.

The estimated value of the 692,007 plants and flowers propagated was \$25,533.17.

STOCK PURCHASED, PROPAGATED, AND PLANTED AT THE WHITE HOUSE GREENHOUSES.

Description.	Number.	Kinds.	Number of varieties.
Plants propagated and used for colonial gardens and grounds.....	3,000	35	75
GROWN IN GREENHOUSES FOR SPRING, AUTUMN, AND WINTER BLOOM, AND FOR DECORATIVE PURPOSES.			
Chrysanthemums.....	5,500		
Antirrhinums.....	2,500		
Carnations.....	7,850		
Poinsettias.....	650		
Roses.....	5,000		
Stevia.....	800		
Tropical and decorative plants.....	12,000		
Violets.....	2,300		
PLANTED AT THE GROUNDS OF WHITE HOUSE GREENHOUSES.			
Antirrhinums.....	1,200		
Asters.....	1,800		
Coreopsis.....	200		
Calendulas.....	200		
Delias.....	200		
Delphinium.....	200		
Gladioli.....	1,000		
Heliopsis.....	200		
Iris.....	300		
Phlox.....	180		
Peonies.....	300		
Roses.....	1,000		
Total.....	45,980		
PLANTS PURCHASED.			
Miscellaneous decorative plants.....	408		
Hardy flowering bulbs.....	21,200		
Tender flowering bulbs.....	24,600		
POTTED AND BOXED FOR WINTER BLOOM.			
Roman hyacinths.....	10,000		
Freesia.....	5,000		
Liliums.....	1,400		
Narcissus.....	8,000		
Ystilla.....	200		

The estimated value of plants propagated, grown, and planted was \$20,731.57.

Storehouse and shops, propagating gardens.—The tools, supplies, and other Government property in the storehouse and shops were cared for.

Repairs were made to pushcarts, wheelbarrows, lawn mowers, scythes, and rubber hose; saws, mattocks, picks, axes, and shears were ground; edged tools sharpened and kept in order, and new tools purchased from time to time as needed. The office horse was regularly shod by the blacksmith and the two automobiles were kept in good condition.

A sale of old, unserviceable, and condemned materials and tools was held on February 27, 1917, and the gross proceeds thereof, amounting to \$175.50, deposited in the Treasury of the United States.

HOUSE NO. 516 TENTH STREET N.W., WHERE ABRAHAM LINCOLN DIED.

Minor repairs were made to the plumbing and heating fixtures and to woodwork.

9. BUILDINGS OCCUPIED AS OFFICES BY THE WAR DEPARTMENT, EXCEPT STATE, WAR, AND NAVY DEPARTMENTS BUILDING.

Monthly inspections were made of these buildings, and they were found to be in safe condition for the purposes for which they were being used.

At the beginning of the fiscal year these buildings were 9 in number. This number has been increased from time to time during the fiscal year so that in June, 1917, there were 28 in all. A proper inspection of these buildings requires our junior engineer, who does this work, to devote at least four days each month to the physical inspection alone, which does not include the time necessary to make his report of the inspection. In cases where it is found that there are conditions which require attention, such as sanitary condition of the buildings, protection against fire, distribution of loads on floors to prevent overloading, special reports are made to the bureaus occupying the buildings, with recommendation that the conditions reported upon be corrected. No funds have been supplied this office by the War Department to defray any expenses connected with these inspections.

10. STATE, WAR, AND NAVY DEPARTMENTS BUILDING.

The officer in charge of public buildings and grounds is the superintendent of this building. His detailed annual report is made to the commission in charge of the building.

11. DEPARTMENTAL TELEGRAPH LINE.

During the year the main battery and local batteries received necessary attention and were maintained in effective condition. All grounds and open circuits on the wires of the line were removed as soon as possible and the line kept in good working order.

12. HIGHWAY BRIDGE ACROSS THE POTOMAC RIVER, D. C.

During the fiscal year the draw was opened 3,416 times for the passage of vessels, or an average of approximately 9.36 openings per day. Three thousand six hundred and eighty-five vessels passed through the draw during that period.

The average daily travel over the bridge on the last seven days in June, 1917, was as follows: Single cars, 137.8; trains of two cars each, 125.1; automobiles, 1,659.7; motor trucks, 249.2; double teams, 474.8; single teams, 263.5; pedestrians, 257.4; equestrians, 45; bicycles, 164.7; motor cycles, 168.2.

All of the steelwork of the main trusses above the roadway level was given a coat of paint. The steel handrail and overhanging steelwork which supports the sidewalk was scraped, cleaned, and given two coats of paint on seven spans.

The joints between the cement walk and the steel curb plate was caulked with slater's cement to prevent the seepage of water through to the supporting truss. Minor repairs were made to the asphalt roadway, draw house, and machinery.

A contract was entered into on June 2, 1917, for furnishing materials and labor and replacing with new piles and timbers old piles and timbers in the upstream end of the center fender of the draw span. Owing to the length of time necessary to get the materials to Washington it was not possible to commence work under the contract before the close of the fiscal year.

13. TREES, SHRUBS, PLANTS, FERTILIZERS, AND SKILLED LABOR FOR THE GROUNDS OF THE LIBRARY OF CONGRESS, THE CAPITOL, AND EXECUTIVE DEPARTMENTS.

Grounds of the Library of Congress.—During the months from July to December the evergreen beds and shrubs were kept cultivated and watered, the privet hedges trimmed, shrubs pruned, and weed growth removed from the lawns. Thirty evergreens that were purchased in the fall were planted to replace a like number that had died. The grounds in the two courtyards were regraded, 40 cubic yards of the old soil was removed and replaced with 306 yards of good topsoil, $\frac{1}{2}$ ton of bone meal, and 6 barrels of air-slacked lime; 3 bushels of grass seed and $\frac{1}{2}$ bushel of rye was sown. In March, April, May, and June the evergreen beds and shrubs were kept cultivated and watered, privet hedges trimmed, weed growth removed from the lawns, and all bare places sown with grass seed.

Grounds of the Capitol.—During the summer and fall the flower beds and vases were kept in good condition, the shrubs were pruned and dead wood removed from the trees. In October the summer flowering and tropical plants were removed from the beds and vases to their winter quarters at the propagating gardens. These beds and borders were then spaded and planted with 18,300 bulbs, 950 dwarf evergreens, and 375 herbaceous plants; of these, 18,300 bulbs, 546 evergreens, and 375 herbaceous plants were purchased in the fall, the remaining 404 evergreens were taken from stock in the nursery, which had been purchased in previous years. In the latter part of April such evergreens as had not been winter killed were removed from the beds and vases and transplanted at the propagating gardens for future use. The beds were dug and planted with 11,600 summer flowering plants and 6 dozen water lilies were planted in the fountain basins.

Grounds of executive departments.—About 14,350 plants were furnished from the propagating gardens for improving the grounds of executive departments. These plants, if purchased from commercial nurseries, would have cost approximately \$1,208.50.

14. UNITED STATES WHARF PROPERTY, WASHINGTON, D. C.

The lease dated March 29, 1915, with George W. Webber for the use of an area on the Potomac River, including buildings opposite lot 14, square 505, expired by limitation on July 1, 1916. Bids for releasing the property were opened on June 20 of that year. Only one bid was received, that of the then occupant, who was given a new lease for the property on July 14, 1916, by the Chief of Engineers for a term of five years from July 1, 1916, to June 30, 1921.

The lease of W. J. Wells for the boathouse at the foot of Seventeenth Street in Potomac Park expired on March 15. Mr. Wells ap-

plied for a renewal in October, 1916. This was approved by the Chief of Engineers, and the new lease executed on October 16, 1916, covering a three-year period from March 16, 1917, to March 15, 1920.

The lease dated February 7, 1912, with Mr. William W. Riley, for a wharf privilege on the Potomac at the foot of Seventh Street, expired by limitation on February 28, 1917. Mr. Riley was granted a new lease on March 23, 1917, by the Chief of Engineers for this property for a period of five years from March 1, 1917, to February 28, 1922, at an increased rental.

Total amount received during the fiscal year for the rent of wharf property was \$2,686.

15. MONUMENT AND WHARF AT WAKEFIELD, VA., THE BIRTHPLACE OF WASHINGTON.

The United States watchman in charge gave the usual care to this property, and during the growing season kept the grass cut around the monument.

16. MEMORIAL TO GEN. ULYSSES GRANT.

The sculptor completed the small model of the equestrian group during the year. This was examined at his studio by a committee of the Commission of Fine Arts, which recommended its acceptance by the Memorial Commission. The sculptor also commenced the enlargement of this model to the full-sized model from which the bronze casting is to be made.

17. STATUE TO COMMODORE JOHN BARRY.

There were no operations under this heading during the year.

18. MEMORIAL TO ABRAHAM LINCOLN.

Operations were continued upon the erection of this memorial. During the year there were erected 32,752 cubic feet of exterior marble, 1,002 cubic feet of interior marble, 17,168 feet of interior limestone, 250,600 red brick, 223 linear feet of marble base, 830 cubic feet of interior marble steps, 6,592 square feet of marble floor tile, 170.4 tons of structural steel, 19 cubic yards of concrete floor fill, 7,600 square feet of colonnade roof fill, 382 cubic yards of concrete floor and slabs, 810 square feet of tile fill, 8,969 square feet of bronze ceiling, 8,704 square feet of skylight, 3,336 square feet of sheet metal, 891 linear feet of cap flashing, 4,212 square feet of curb flashing, and 10,442 square feet of waterproofing, which, in each case, completed the portion of the work referred to. There was also completed in place 2,137 linear feet of galvanized pipe, 55 feet of brass pipe, 33 sections of iron-pipe rail, 2 steel doors, 12 gratings, 17 ladders, 17 indirect radiators, 3,767 cubic feet of granite, 66,553 square feet of exterior cleaning and pointing, 68,371 square feet of interior cleaning and pointing, and carving to the value of \$29,575.

On July 10, plans and specifications for the terrace wall and masonry approaches about the building were issued and advertised

with invitations for proposals for their execution. Four proposals from general contractors were received and opened on August 10, and on September 15 the bid of the George A. Fuller Co., which was the lowest submitted, was accepted, and a formal contract was entered into with them for the work. Operations were begun immediately under this contract and during the year the following work was completed: Thirty thousand seven hundred and fifty-nine cubic yards of excavation, 889 cubic yards of concrete foundation, 2,647 cubic yards of concrete wall and slab, 115 linear feet of cast-iron drain pipe, and two (2) catch basins.

Of the \$50,000 appropriated for the expenses of the commission and the cost of plans and designs, there was expended to June 30 the sum of \$46,634.77, leaving a balance unexpended of \$3,352.69. Of the \$2,594,000 authorized and appropriated up to the end of the fiscal year for the erection of the memorial and its approaches, there was expended to June 30, \$1,881,102.22, leaving a balance unexpended of \$712,897.78, the greater part of which was covered by existing obligations.

(A photograph showing the condition of the work on June 30, 1917, accompanies this report.)

19. DISTRICT OF COLUMBIA ARMORY COMMISSION.

There were no operations under this project during the fiscal year.

20. COMMISSION OF FINE ARTS.

There were two changes in the personnel of the commission during the fiscal year. The detailed annual report of the commission is made direct to the President.

21. MEMORIAL TO THE WOMEN OF THE CIVIL WAR.

During the fiscal year ending June 30, 1917, the construction of the memorial building under the general contract was completed and final payment to the contractors was made on March 31.

On November 10 a contract was entered into with Tiffany Studios, of New York City, in the sum of \$10,000 for furnishing and erecting the three large stained-glass windows in the assembly hall. This work was completed in May.

On December 22 a contract was entered into with Edw. F. Caldwell & Co., of New York City, in the sum of \$9,319.75 for furnishing and erecting the electric-light fixtures required in the building and upon its approaches. This amount was subsequently increased to \$9,413.25. Work under this contract has been completed with the exception of the bracket lights for the main halls and the erection of the two lamp standards upon the approaches. These latter can not be put in position until the work upon the approaches has advanced sufficiently to permit the placing of their pedestals.

On March 29 plans and specifications for the development of the grounds and approaches of the building were issued and advertised with invitations for proposals for executing the work. Four proposals from general contractors were received and opened on April 16, and were found to be all in excess of the funds available. The

plans were thereupon modified, by the simplification of some portions of the work and the omission of all work upon the rear portion of the square upon which the building is located. Three of the original bidders submitted new proposals on May 21, and on May 28 a formal contract in the sum of \$23,700 was entered into with Arthur L. Smith & Co., of Washington, D. C., based upon their bid in that amount, the lowest received. Preliminary work under this contract was carried on during the month of June.

On May 17 the President approved Senate joint resolution No. 61, of the first session, Sixty-fifth Congress, authorizing the Commission on Memorial to Women of the Civil War to grant permission to the American Red Cross to erect temporary buildings upon the square occupied by the memorial. In pursuance of permission granted under this authority, the American Red Cross erected immediately west of the memorial a one-story frame office building 180 feet long by 100 feet wide. The resolution referred to requires that this shall be removed within three years unless otherwise officially provided by Congress.

During the first half of the year the old brick church building at the corner of Eighteenth and E Streets, on the northwest corner of the square, was remodeled and repaired and is now being occupied by the employees of the treasurer's office of the American Red Cross.

The funds available for the work of this commission consist of the following:

Amount appropriated by the Government.....	\$400,000.00
Amount of private contributions to June 15, 1917.....	428,140.00
Interest on private contributions to June 15, 1917.....	28,543.97
Total	854,683.97

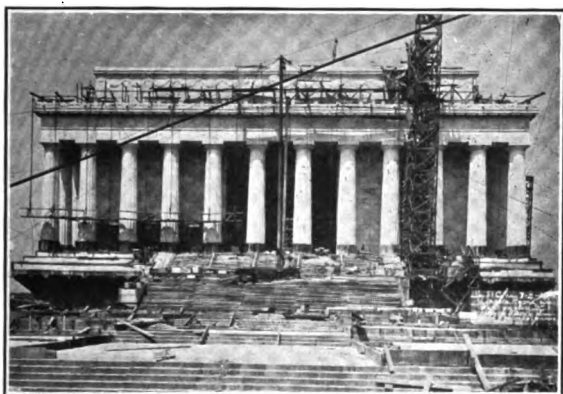
Of this amount there was expended to June 30 the sum of \$820,-295.71, leaving a balance unexpended of \$34,388.26, all but a small portion of which was covered by existing obligations.

(A photograph showing the condition of the work on June 30, 1917, accompanies this report.)

22. ARLINGTON MEMORIAL AMPHITHEATER AND CHAPEL.

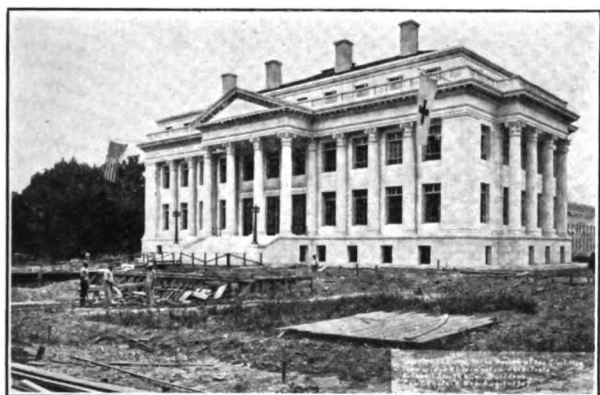
During the fiscal year ending June 30, 1917, operations were continued upon the erection of the memorial. The principal items of construction placed in the building during the year were as follows: Thirty-five thousand one hundred and forty cubic feet of marble, 11,856 cubic feet of concrete steps and slabs, 26 tons of structural steel, 246,000 brick, 13,470 square feet of terra-cotta partitions, 5,158 square feet of copper roofing, 446 square feet of skylight, 684 square feet of copper flashing, 8,500 square feet of waterproofing, 50 square feet of damp-proofing, 14,700 square feet of cement finish, 1,300 square yards of furring and lathing, 3,087 square yards of plain plastering, 2,536 foot girths of ornamental plastering, and ornamental iron stairway to the value of \$5,000, electric work to the value of \$650, heating work to the value of \$650, carpentry work to the value of \$700, plumbing work to the value of \$1,200, and carving to the value of \$7,000.

Proposals for the construction of the masonry approaches to the memorial were received on July 26 from three bidders in response



THE LINCOLN MEMORIAL, EASTERN FRONT.

View looking west on the axis of Mall, Potomac Park, showing the progress of the work, July 2, 1917.



**MEMORIAL TO WOMEN OF THE CIVIL WAR, EASTERN FRONT.
(NEW RED CROSS BUILDING.)**

View looking southwest, Seventeenth Street between D and E Streets NW.
Dedicated May 12, 1917.



**THE ARLINGTON MEMORIAL AMPHITHEATER.
(ARLINGTON CEMETERY, VIRGINIA.)**

Looking toward the southeast, showing the progress of the work,
July 2, 1917.

to invitations issued and advertised on June 26, 1916, based upon the approved plans. The proposals were found to be all in excess of the funds available for the work, but that of the George A. Fuller Co. being the lowest, was accepted after the elimination of certain features of the design and the simplification of others. A formal contract for the sum of \$91,500 was accordingly entered into with the Fuller Co. on December 10. On account of the severity of the winter weather, active operations upon this portion of the work was postponed until the spring of 1917. Some of the preliminary work under this contract was completed up to June 30.

On February 6, the time limit of the contract for the memorial building, which would expire by limitation on February 15, was waived and extended for a period of one year. This was done because of the unavoidable delays encountered by the contractors, particularly in the production of the quality of marble required for this building.

Of the \$750,000 authorized and appropriated for this memorial, there was expended to June 30 the sum of \$318,786.80, leaving a balance unexpended of \$431,213.20, all of which will be required to finish the work upon the approved plans.

(A photograph showing the condition of the work on June 30, 1917, accompanies this report.)

23. MONUMENT TO FRANCIS SCOTT KEY AND OTHERS.

This is authorized in deficiency appropriation act approved July 29, 1914, which provides that the monument shall be erected at Fort McHenry, Baltimore, Md., under the direction of the Secretary of War, and appropriates \$75,000 for the purpose.

By direction of the Secretary the officer in charge of public buildings and grounds acts as the personal representative of the Secretary of War in the supervision of the construction of the monument. He is also the disbursing officer of the funds appropriated.

The sculptor to whom the first prize was awarded in the competition for this monument modified the architectural position of his design as suggested by the jury of award and the contract for the execution, construction, and erection of the monument was awarded him, and signed on October 19, 1916. The contract provides that the work shall be completed within two and one-half years from its date. Between the date of signing the contract and December 1, 1916, the contractor furnished the plans and details for the pedestal and foundation, and a small sketch model in plaster of the pedestal and figure. In March, 1917, he completed work upon the quarter size model which was accepted upon the recommendation of the Commission of Fine Arts and a plaster copy of it sent by the contractor to Washington, where it was placed in the new building of the National Museum for safe keeping through the kindness of the officials in charge of the museum. This model, which is over 10 feet in height, has been placed on exhibition in the rotunda of the building.

24. ARLINGTON MEMORIAL BRIDGE COMMISSION.

On December 13, 1915, the officer in charge of public buildings and grounds was designated as the executive and disbursing officer of this commission, which was created by section 23 of the public buildings

act of March 4, 1913 (37 Stats., p. 885). There were no operations during the fiscal year as no appropriation has been made for the expenses of the commission, which for that reason has been unable as yet to enter upon its duties.

25. PUBLIC BUILDINGS COMMISSION.

The act of Congress approved July 1, 1916, created a Public Buildings Commission composed of the chairman of the Senate Committee on Appropriations and two other members of that committee, the chairman of the Senate Committee on Public Buildings and Grounds and two other members of that committee, the chairman of the Committee on Appropriations of the House of Representatives and two other members of that committee, the chairman of the Committee on Public Buildings and Grounds of the House of Representatives and two other members of that committee, the Superintendent of the Capitol Building and Grounds, the officer in charge of public buildings and grounds, and the Supervising Architect of the Treasury—15 members in all. The duties imposed by the act upon this commission were to investigate and ascertain what public buildings are needed in the District of Columbia to provide suitable and adequate accommodations with allowances for future expansion for all of the offices, establishments, and public services of the Government in the District of Columbia, the proper location of such buildings, the probable cost thereof, and the probable cost of such new sites as they may deem it necessary for the Government to acquire.

The first meeting of this commission was held on February 15, 1917, at the room of the Senate Committee on Appropriations. At this meeting the officer in charge of public buildings and grounds, one of the members of the commission, was appointed its executive and disbursing officer. At this meeting also the Superintendent of the Capitol Building and Grounds, the officer in charge of public buildings and grounds, and the Acting Supervising Architect of the Treasury were appointed a committee to prepare and submit to the commission an outline plan showing the program of operations of the organization needed for the work to be done. This plan was furnished the commission and on June 16, 1917, the field work of collecting data concerning the housing of all Government activities in the District of Columbia was commenced by the executive officer of the commission.

DISTRIBUTION OF EXPENDITURES.

The following summary shows in tabulated form the various expenditures during the fiscal year, including liabilities actually due at the close, for each separate work under the charge of this office:

General office expenses.....	\$14, 065. 00
Improvement and care of parks, including the propagating gardens.....	332, 143. 20
Care and repair of Executive Mansion, grounds, and greenhouses.....	65, 954. 95
Improvement and maintenance of telegraph line connecting the Capitol with the executive departments and the Government Printing Office.....	490. 02
Furnishing trees and plants for grounds of executive departments, Library of Congress, and Capitol.....	5, 995. 81

Care and maintenance of Washington Monument.....	\$13,811.70
Repairs to building where Abraham Lincoln died.....	141.24
Maintenance of Highway Bridge across Potomac River, D. C.....	21,530.00
Monument in memory of Francis Scott Key and others, Fort McHenry, Baltimore, Md.....	20,212.22

**ABSTRACT OF CONTRACTS IN FORCE DURING THE FISCAL YEAR ENDING
JUNE 30, 1917, UNDER THE OFFICE OF PUBLIC BUILDINGS AND GROUNDS,
WASHINGTON, D. C.**

Contractor: United States Casualty Co., of New York, N. Y., for making monthly inspections of elevator and machinery in the Washington National Monument.

Date of contract: July 18, 1916.

Approved: Emergency contract.

Date of commencement: July 1, 1916.

Date of completion: June 30, 1917.

Contractor: Charles H. Niehaus, New Rochelle, N. Y., for furnishing materials and labor and constructing and erecting a monument to Francis Scott Key and others in Fort McHenry Park, Baltimore, Md.

Date of contract: October 19, 1916.

Approved: Authority Secretary of War.

Date of commencement: October 19, 1916.

Date of completion: April 19, 1919.

Contractor: Boyle-Robertson Construction Co., Washington, D. C., for furnishing materials and labor and constructing the superstructure for the upper concrete retaining wall on the Sixteenth Street side of Meridian Hill Park, Washington, D. C.

Date of contract: October 27, 1916.

Approved: Emergency contract.

Date of commencement: Within five days after date.

Date of completion: Within 90 days of date of commencement.

Contractor: John J. Earley, Washington, D. C., for furnishing materials and labor and constructing an arched entrance to the west side of Meridian Hill Park, Washington, D. C.

Date of contract: October 28, 1916.

Approved: November 6, 1916.

Date of commencement: Ten days after date of receipt of notification of approval.

Date of completion: Within 90 days of suitable working weather after date of receipt of notification.

Contractor: Arthur L. Smith & Co., Washington, D. C., for furnishing materials and labor and constructing a double park lodge in Montrose Park, Washington, D. C.

Date of contract: March 22, 1917.

Approved: Emergency contract.

Date of commencement: Within 10 days after the date of contract.

Date of completion: Within 90 days after date of commencement.

Contractor: Clarke & Winston Co. (Inc.), Washington, D. C., for furnishing materials and labor and making repairs to the center fender of the Highway Bridge across Potomac River, D. C.

Date of contract: June 2, 1917.

Approved: Emergency contract.

Date of commencement: Within 15 days after date of contract.

Date of completion: Within six weeks from time of arrival of all material in Washington.

Contractor: Charles H. Tompkins, Washington, D. C., for furnishing materials and labor and constructing new cement walks, coping, and steps and stone walls at High Service Reservoir Park, Washington, D. C.

8730 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1917.

Date of contract: June 15, 1917.

Approved: Emergency contract.

Date of commencement: Within seven days after date of contract.

Date of completion: Within 90 days after date of contract.

Contractor: A. C. Moses Construction Co., Washington, D. C., for constructing the end wing with porches and colonnades of a field house in East Potomac Park Washington, D. C.

Date of contract: June 19, 1917.

Approved: July 18, 1917.

Date of commencement: Within 30 days after date of receipt of notification of approval of contract by Chief of Engineers.

Date of completion: Within 10 months after date of receipt of said notification.

Contractor: United States Casualty Co., New York, N. Y., for making monthly inspections of the elevator and machinery in the Washington National Monument, Washington, D. C., during fiscal year ending June 30, 1918.

Date of contract: June 22, 1917.

Approved: Emergency contract.

Date of commencement: July 1, 1917.

Date of completion: June 30, 1918.

Contractor: American Mosaic Co., Washington, D. C., for furnishing materials and labor and constructing new terrazo floors, marble wainscoting, and partitions in lodge house at Washington Monument, Washington, D. C.

Date of contract: June 25, 1917.

Approved: Emergency contract.

Date of commencement: Within five days after date of contract.

Date of completion: Within 70 days after date of contract.

Contractor: Carroll Electric Co., Washington, D. C., for furnishing and installing a new centrifugal pump and motor for operating the fountain on Union Station Plaza, Washington, D. C.

Date of contract: June 27, 1917.

Approved: Emergency contract.

Date of commencement: Within five days after date of contract.

Date of completion: Within three months after date of contract.

NORTHERN AND NORTHWESTERN LAKES (CORRECTING AND ISSUING CHARTS, SURVEYS, INVESTIGATION OF LAKE LEVELS); PRESERVATION OF NIAGARA FALLS (SUPERVISION OF POWER COMPANIES).

REPORT OF LIEUT. COL. F. W. ALTSTAETTER, CORPS OF ENGINEERS.

SURVEY OF NORTHERN AND NORTHWESTERN LAKES.

Operations during the fiscal year have included work as follows:

CHARTS.

The reduction, preparation, and reproduction of charts have continued under the immediate supervision and direction of Asst. Engineer Edward Molitor.

Sold and issued.—The following statement shows the number of charts received and disposed of at this office during the fiscal year ending June 30, 1917:

On hand July 1, 1916.....	53, 238
Prepared by this office.....	26, 263
Total.....	79, 501
Sold.....	13, 174
Issued for official use.....	3, 109
Transferred to United States Engineer offices, Buffalo and New York City.....	2, 942
Destroyed (out of date).....	997
On hand July 1, 1917.....	59, 279
Total.....	79, 501

The total number of charts sold by this office during the year was 13,174, the total amount received from these sales being \$3,189.50, which was duly deposited to the credit of the Treasurer of the United States. The total number of charts that have been sold, issued, and transferred through this office to June 30, 1917, is 554,394, including those transferred to the United States Engineer offices at Buffalo and New York, N. Y.

Of the five general charts of the Great Lakes, published under terms of agreement noted on page 2703 of the Annual Report of the Chief of Engineers for 1910, from copperplates loaned by the Hydrographic Office, United States Navy, 35 were issued, 1 transferred to New York, N. Y., 24 were canceled, and 227 sold for a total of \$49.60. These figures are included in the above statements.

Corrected and revised editions completed.—The work during the year pertaining to republishing existing charts of the series em-

braced corrections for changes constantly being made in lights and other aids to navigation, modifications due to river and harbor improvements, latest magnetic determinations, additional and corrected sailing courses, and topographic and hydrographic changes developed by commercial and industrial enterprise on the shores of the Lakes and their tributary and connecting waters. In cases where geodetic control had not already been referred to the standard datum of 1901, and where soundings had not been referred to the standard low-water planes approved March 16, 1909, the charts were so revised, whenever practicable. Charts in stock were corrected as far as practicable for all information received to the day of issue, a large number of the more extensive corrections being printed on the power press from specially prepared lithographic stones.

In the statement of work on charts given below the edition number has reference only to the editions lithographed in colors, many charts having previously appeared as black prints from the original engraved copperplates. Copies of charts were corrected to date, the engravings on stone or copperplate correspondingly modified, transfers made to stone, color plates prepared, and the charts printed in colors, as follows:

1. Coast chart No. 1, Lake Huron, scale 1:120,000 (Inset Harbor Beach, Mich., engraved copperplate, scale 1:8,000); third edition, from engraved stones; 736 copies printed in five colors; issued September 12, 1916.
2. Ashland and Washburn Harbors, Wis., scale 1:15,000; second edition, from Mollitor-process copperplate; 492 copies printed in five colors; issued October 13, 1916.
3. St. Lawrence River No. 3, scale 1:30,000 (Inset Ogdensburg, N. Y., and Prescott, Ontario, heliogravure copperplate, scale 1:15,000); fourth edition, from engraved copperplate; 976 copies printed in five colors; issued November 7, 1916.
4. Huron Harbor, Ohio, scale 1:5,000; third edition, from Mollitor-process copperplate; 545 copies printed in five colors; issued November 15, 1916.
5. Coast chart No. 8, Lake Michigan, scale 1:120,000; second edition, from engraved copperplate and stone; 979 copies printed in five colors; issued December 23, 1916.
6. Les Cheneaux Islands, Mich., scale 1:40,000; third edition, from engraved stones; 742 copies printed in five colors; issued December 28, 1916.
7. Chicago Lake Front No. 2, scale 1:40,000; second edition, from engraved stones; 995 copies printed in five colors; issued January 12, 1917.
8. St. Lawrence River No. 4, scale 1:30,000; fourth edition, from engraved copperplate; 969 copies printed in five colors; issued January 15, 1917.
9. Beaver Island Group, scale 1:80,000; fourth edition, from engraved stones; 749 copies printed in five colors; issued January 19, 1917.
10. Detroit River, scale 1:40,000 (Inset of Lower Detroit River, newly engraved copperplate, scale 1:25,000); tenth edition, from engraved copperplate; 3,641 copies printed in five colors; issued February 14, 1917.
11. Lake Champlain No. 1, scale 1:40,000; second edition, from engraved copperplate; 494 copies printed in five colors; issued March 9, 1917.
12. Lake Champlain No. 2, scale 1:40,000; second edition, from engraved copperplate; 506 copies printed in five colors; issued March 24, 1917.
13. Lake Champlain No. 3, scale 1:40,000; second edition, from engraved copperplate; 486 copies printed in five colors; issued April 17, 1917.
14. Keweenaw Waterway, Mich., scale 1:30,000 (insets, Portage Entry and Portage Lake Upper Entrance, scale 1:15,000); fourth edition, from engraved stones; 1,236 copies printed in six colors; issued April 18, 1917.
15. General chart of Lake Superior, scale 1:500,000 (Inset Grand Marais, Mich., scale 1:16,000, and Michipicoten Harbor, Ont., scale 1:5,000); eighth edition, from heliogravure and Mollitor-process copperplates; 1,841 copies printed in five colors; issued May 21, 1917.
16. Lake Champlain No. 4, scale 1:40,000; second edition, from engraved copperplate; 491 copies printed in five colors; issued May 25, 1917.

17. General chart of Lake Huron, scale 1:400,000; fifth edition, from engraved stones; 2,853 copies printed in five colors; issued June 15, 1917.

18. Coast chart No. 8, Lake Superior, scale 1:120,000 (insets. Todd Harbor, Rock Harbor, and Washington and Grace Harbors, scale 1:80,000); fourth edition, from engraved and Mollitor-process copperplates; 1,404 copies printed in five colors; issued June 28, 1917.

Corrected and revised editions in progress.—At the close of the year the engravings for nine charts were undergoing correction or revision preparatory to the issue of new editions. Two of these charts were being revised to standard low-water datum.

New charts issued.—The following new charts were completed and issued in colors during the year:

1. New York State Canals No. 6, scale 1:40,000; main line of barge canal from Cross Lake to Lyons, and including Cayuga and Seneca branch to Cayuga and Seneca Lakes; first edition, from engraved stones; 957 copies printed in six colors; issued July 15, 1916.

2. Coast chart No. 5, Lake Superior, scale 1:120,000 (inset Ontonagon, Mich., new engraved copperplate, scale 1:12,000); south coast from Ontonagon, Mich., to Oronto Bay and Outer Island, Wis.; first edition, from engraved stones; 721 copies printed in five colors; issued August 9, 1916.

New charts in progress.—The following new charts are being prepared, and at the close of the fiscal year the work had progressed as stated below:

1. White Lake Harbor, Mich., scale 1:15,000; for first edition; copperplate engraving completed and transfer to stone made, ready for printing proof.

2. Pentwater Harbor, Mich., scale 1:12,000; inset to be added to Lake Michigan Coast chart No. 7; stone engraving completed.

3. New York State Canals No. 7 (Cayuga and Seneca Lakes), scale 1:60,000; for first edition; stone engraving practically completed.

4. Grand Island, Mich., scale 1:25,000; with inset of Munising (hellogravure copperplate reduction from existing harbor chart), scale 1:12,000; new stone engraving for fourth edition, nearly completed.

5. Coast chart No. 2, Lake Michigan, scale 1:120,000; with insets of Strawberry Channel, Wis., scale 1:60,000, Oconto, Wis., scale 1:20,000, and Algoma, Wis., scale 1:12,000; new stone engraving for fourth edition, approaching completion.

6. Buffalo Harbor, N. Y., scale 1:15,000; for first edition; stone engraving well advanced.

MISCELLANEOUS LITHOGRAPHIC WORK.

In addition to the chart operations above reported, other items of work were accomplished as detailed below, either in connection with regular Lake Survey functions or for other Government agencies. In cases where the expenses of work performed for other offices were first assumed by the Lake Survey appropriation, the amounts have been or will be reimbursed to this appropriation by proper transfer settlement.

1. *For the Ohio River board of engineers on locks and dams.*—Thirty-eight charts of the Ohio River, received from the Louisville engineer office, were photographed, and 200 copies of each printed in black, completing the series of 232 charts in all.

2. *For the assistant department engineer, Eastern Department, Ancon, Canal Zone.*—Three reconnaissance maps of the Panama Canal Zone were reproduced by photolithography, and 500 copies of each printed in four colors, completed October, 1916.

3. *For the United States engineer office, Detroit, Mich.*—Map of vicinity of Sault Ste. Marie, Mich., and Ontario, scale 1:20,000; transfer was made from the original stone engraving, color stones prepared, and 2,000 copies printed in

three colors, for insertion in Statistical Report of Lake Commerce for the year 1916; March, 1917.

4. *For the department engineer, Central Department, Chicago, Ill.*—Map of Fort Riley, Kans., military reservation was reproduced and 13,000 copies printed in two colors, completed June, 1917.

5. *Sundry Lake Survey work.*—A new hydrograph showing mean lake level from 1860 to 1916, inclusive, was prepared and an edition of 100 copies printed in black.

Six tables showing monthly mean water levels on the various Lakes for 61 years, 1860–1909, were photolithographed, and 400 copies of each printed in black on bond paper.

Under instructions from the Chief of Engineers the International boundary line, as established by the International Waterways Commission and adopted August 15, 1913, was added to 12 Lake Survey charts, completing the boundary delineation on all affected charts of the series.

Index chart of northern and northwestern lakes, scale 1:4,500,000; showing numbers and limits of published charts, for chart catalogue; engraving on stone and color plates were revised and 5,000 copies printed in four colors April, 1917.

Miscellaneous printing for office purposes included 10,000 chart mailing slips, 4,000 letterheads, 60 sheets of centimeter cross section on tracing linen, and 35 forms for computing magnetic declination.

BULLETINS.

The subject matter for the bulletin and supplements has been edited and their publication (under contract) supervised by Mr. O. C. Hattery.

The numbers published during the year are as follows: Supplements Nos. 3, 4, 5, 6, and 7 to Bulletin No. 25, issued on July 18, August 17, September 18, October 19, and November 17, 1916; Bulletin No. 26, issued April, 1917; and Supplements Nos. 1 and 2 to Bulletin No. 26 issued on May 22 and June 18, 1917, respectively.

Supplements Nos. 3 to 7, Bulletin No. 25, covered all reported changes of interest to navigators arising between July and November 1916. As occasion arises, small maps, showing locations of new shoals, changes in important channels, harbors not otherwise charted etc., are inserted in the bulletins and supplements.

Bulletin No. 26, thoroughly revised, and giving the latest information obtainable as to channels, harbors, obstructions, and other matters of interest to navigators over the entire lakes and connecting waters, was issued in April, 1917.

Supplements Nos. 1 and 2, Bulletin No. 26, issued prior to the close of the fiscal year, covered all changes received to June 15, 1917.

The present edition of the publication is 2,400 copies.

SURVEYS.

Field and office work pertaining to topographic and hydrographic surveys, hydraulic measurements, magnetic observations, triangulation, and water levels, and the repairs, maintenance, and operation of floating plant and equipment were continued during the year under the general supervision of Principal Asst. Engineer F. G. Ray.

On July 1, 1916, three field parties were engaged on surveys on the Great Lakes, one on the New York canals, and one on the Lake of the Woods. The party on the New York canals worked in two sections, one in advance on triangulation and the second following with the topographic and hydrographic surveys. The first completed its work

in September and was assigned to reconnaissance for primary triangulation in the Straits of Mackinac and north end of Lake Michigan. The second section completed the survey of the New York canals in October and then undertook a survey of the harbor at Charlotte, N. Y. The work of the five parties was continued to the end of the season. During the present season five field parties have taken the field, four of which are at work on the Great Lakes and one on the Lake of the Woods. A brief description of the work of these several parties follows.

West end of Lake Erie.—A general resurvey of the west end of Lake Erie, which has been in progress continuously during field seasons since October, 1914, was being extended southerly from the vicinity of Stony Point at the beginning of the year. The survey consists principally of sweeping in the open waters of the lake outside of the 18-foot contour and the determination of the character, extent, and least depth of each shoal or obstruction that may be encountered. New topographic surveys are carried along the adjacent shores usually at times when weather conditions are unfavorable for hydrography. Sufficient triangulation is executed for control and location. Assistant Engineer M. S. MacDiarmid was in charge of this work throughout the year. The steamer *Surveyor*, which quartered the party, was used on the sweeping and for landing, transferring, and picking up the shore parties. Headquarters were being maintained at Monroe Piers at the beginning of the year but were transferred to Toledo, Ohio, later in the season.

The sweeping work was carried southward from Stony Point, covering a strip about 2 miles wide along the 18-foot contour for a distance of about 6 miles. From there the work was continued south and east, covering a block about 7 miles wide north and south and extending from the west end of the lake easterly to longitude $83^{\circ} 00'$. This joins the work of the previous year on the north, and earlier work of the resurvey on the east. A total area of 121 square miles was swept after July 1. The only obstructions found within this area are old fish stakes which have been broken off below water by the ice. These stakes, while of little or no importance so far as navigation is concerned, have been the source of much difficulty and delay in the operation of the sweep, and the progress of the survey has been hampered considerably. Topographic surveys were carried along the shores from Stony Point to a point 4 miles north of North Cape, excepting for a distance of 1 mile at Monroe Piers which had been surveyed in the previous June, and along the south shore $7\frac{1}{2}$ miles westerly from Turtle Creek. The topography covered about 15 square miles and extended along $27\frac{1}{2}$ miles of shore. The control for the season's work depended upon the previously determined positions of Stations Middle Sister and Stony Point, and Detroit River Lighthouse and Monroe, Toledo, Turtle Island, and West Sister Island Lighthouses. Twenty-two sextant signal buoys were set and located for control of the hydrography, and a point was located but not marked near Otter Creek to check the stadia work. Field work was suspended on November 18, and the party returned to Detroit, where the steamer was laid up for the winter. The technical employees were retained in service through the winter, being employed in the office on reduction and plotting of the season's surveys and on miscellaneous office work.

The party again took the field on May 14, 1917, and from then to the end of the year was engaged in sweeping an area south of a line running west from West Sister Island and extending easterly to a line joining Ward Canal, on the south shore, with West Sister Island. The work covered about $25\frac{1}{2}$ square miles. Topography has been extended $2\frac{1}{2}$ miles easterly from Turtle Creek.

For use in locating the hydrographic work and checking the stadia survey a new station has been placed on Locust Point and its geodetic position determined. This station is on land now owned by Mr. Frank Brown and is 184 feet west of the west fence line of road leading back from the lake towards Oak Harbor and is 36 feet back from the present shore line. It is marked by an iron pipe set in a concrete monument, flush with the surface of the ground, which is about 3 feet above lake level. A comparison of the geodetic position of the new station with that of the one established on this same point in 1877, and which has disappeared, indicates that the shore line at this point has receded about 170 meters in 40 years. The hydrography has been located from sextant signal buoys whose positions were determined from the station at Locust Point and the light-houses at Toledo and West Sister Island.

Saginaw Bay and River.—At the beginning of the year a party in charge of Junior Engineer Ira C. Sunderland on the steamer *Col. J. L. Lusk* was engaged in making a resurvey of Saginaw Bay. This survey included the sweeping of all waters outside of the 18-foot contours, except in a few localities where fish-net stakes made sweeping impracticable, the sounding of areas between the 12 and 18 foot contours, topographic surveys along the shores, and a system of triangulation for control. The sounding work after July 1 covered the flat areas between Pointe aux Gres and Lengsville along the west shore and between Little Charity Island and Bayport along the east shore, a total of 98 square miles. The sweeping was in the central part of the bay off Pinconning and Pine River, covering an area of $42\frac{1}{2}$ square miles. The topographic work extended from Bayport to the mouth of Saginaw River and between the Pinconning and Saginaw Rivers, covering a total distance of 64 miles and an area of 81 square miles. The system of triangulation for the control of the surveys had been completed during the previous year and is described in the last annual report. The survey of Saginaw Bay was completed on October 4.

A survey of Saginaw River, which was undertaken in 1915 by the Saginaw Bay party at times when weather conditions interfered with operations in the bay, was continued under like conditions in 1916. It was still incomplete when the surveys in the bay were finished and a detached party in charge of Junior Engineer A. B. Jones was left to continue the work. This survey was carried to completion on November 19, 1916, and the party was then disbanded. The survey work on Saginaw River after July 1 includes topography from the interurban bridge to the head of the river and sounding of the river channel from the mouth of the river to the Grand Trunk Railway bridge and from the interurban bridge just above Bay City to the head of navigation. The topographic survey included the villages of Zilwaukee and Carrollton, but in Saginaw only reached a short distance from the river, the chart data for the balance of the city being obtained from the city plats. These latter, however, were

carefully checked on the ground and prominent structures were located. Triangulation was extended up the river from the system in Saginaw Bay and was used for control of the survey. The terminus of the triangulation system was checked by intersections from stations near the river.

North end of Lake Huron.—The survey party in charge of Junior Engineer Ira C. Sunderland completed the survey of Saginaw Bay on October 4, 1916, and proceeded to Detour and began the proposed survey along the north shore of Lake Huron. As now contemplated, this survey will include hydrography over a belt about 5 miles in width along the shore from the easterly end of Les Cheneaux Islands to the International Boundary and the topography of the adjacent shores. The work during the balance of the 1916 season was confined to off-shore sounding from abreast of Albany Island to Espanore Island. An area of 62½ square miles was covered. Control for this work was established from triangulation points of prior surveys. Field work was suspended on November 17 and the party returned to Detroit, stopping en route to inspect gauges at Harbor Beach, Port Huron, and St. Clair Flats. Detroit was reached on November 22 and the field party was immediately disbanded.

This party was again organized in the following spring, and left Detroit on May 16, 1917, to resume the surveys at the head of Lake Huron. The three gauges above named were inspected enroute, and the party reached Detour on May 21, where it has been stationed up to the end of the year. The work accomplished up to June 30 includes sweeping over an area of about 21 square miles between Saddlebag and Gravel Islands, sounding of 14 square miles between Espanore and Gravel Islands, and topography along 48 miles of shore between Point St. Vital and Gravel Island. Control for the work of this season has been established by the location of triangulation stations on Espanore and Gravel Islands. The first was located from Detour and Spectacle Reef Lights and the latter by water triangulation.

West shore of Lake Michigan.—The general resurvey along the west shore of Lake Michigan has been continued during the year by a party on the steamer *Search* in charge of Junior Engineer Sherman Moore. At the beginning of the year the work had progressed to the vicinity of Poverty Island Passage, the hydrography being completed as far north as Poverty Island and the topographic survey of Summer Island being underway. During the early part of July a triangulation system was carried northward from the line of St. Martin-Little Gull (1903) around the westerly side of Summer Island and through the passage between Summer Island and Point Detour to establish a base for water triangulation which was later extended northerly along the shore for control of the surveys. The hydrography was resumed on July 13. Between then and the end of the season the sweeping work, which covered all areas between the 3 and 11 fathom contours, was advanced to Point aux Barques, the outside sounding, out to the 5-mile limit, was completed to Manistique, and the triangulation was carried through to a tie for position at Squaw Island Lighthouse. The sweeping after July 1 covered an area of about 44 square miles and the additional sounding about 104 square miles. Shore-line topography was advanced to Manistique, a distance of 58 miles. The surveys were coordinated by means of water triangulation carried along the shore from Point

Detour, starting off a line of the system above noted. A base line was measured at Manistique and the triangulation was continued through to Seul Choix Point Lighthouse and a connection made to the lighthouse on Squaw Island. The approximate position of the latter has been determined from Green Bay through the uncompleted primary system. A preliminary adjustment of the water triangulation has thus been possible. The final adjustment can not be made until the primary triangulation, which is now in progress, has been completed; but it is probable that the change will not affect the detail maps of the survey.

Field work was suspended on October 29, and the steamer and party reached Detroit on November 5. The gauge at Mackinaw City was inspected on October 30, and Mr. Moore proceeded from there by rail and inspected the automatic gauges at Marquette and Milwaukee, then returning to Detroit.

This party again took the field on May 10, 1917, to resume its work on Lake Michigan. Stormy weather caused delays of several days en route, and a stop was made at Mackinaw City for inspection of the automatic gauge. Manistique, the temporary headquarters, was reached on May 17. From then to the end of the year the party was engaged on hydrographic work, completing the same to Manistique, except some detail sounding to be done on Wiggins Reef and a little inshore sounding at Thompson. In addition, an area of about 6 square miles to the eastward of Manistique was swept. A total area of 40 square miles was swept prior to July 1. Topographic surveys were advanced about 5 miles easterly from Manistique.

New York State canals.—Surveys of the natural navigable waters of the New York canals were in progress at the beginning of the year. The triangulation for control was then being advanced westerly in the vicinity of Amsterdam, and the topographic work had reached Schenectady. The triangulation work, which was in charge of Junior Engineer H. F. Johnson, consisted of the placing and location of points at intervals along the line of the canal for connecting and coordinating the surveys of the Deep Waterways Commission, the State surveys, and the surveys of the topographic party. These points were located from the State primary stations, either directly or through short chains of newly executed secondary triangulation. The control was completed to Utica on September 8. The triangulation party was then disbanded and Mr. Johnson proceeded to Detroit.

The work of the topographic party, which was in charge of Surveyor Fred Lockwood, consisted of revising and coordinating the surveys of the Deep Waterways Commission and the surveys which had been made by the State in connection with the construction of the canal and of supplementing these data with such additional surveys as were found to be required for charting purposes. The survey was completed westward to Utica on October 22, 1916. This marked the completion of field work under the project for charting the waters of the New York canals. The party then proceeded from Utica to Rochester and took up a resurvey of the lower Genesee River and Charlotte Harbor.

The survey work on New York canals after July 1 included the establishment of control along 74 linear miles of canal, verification or

revision of 14 square miles of earlier surveys, and 90 square miles of new topography.

Charlotte Harbor, N. Y.—A survey of Genesee River to the head of navigation, including Charlotte Harbor, was made in October and November, 1916, by the field party in charge of Surveyor Fred Lockwood. This survey was for the purpose of preparing a new harbor chart of Charlotte, to include the Genesee River to the head of navigation, as proposed in the chart project. The field work included new topographic surveys above the limits of the old chart, a revision of the old surveys near the mouth of the river, and the sounding of the river. The surveys were connected and adjusted to the positions of the primary triangulation station Pinnacle Hill and the old lighthouse in Charlotte. Field work was completed on November 11, 1916, and the party proceeded from Rochester to Detroit on the launch *Inspector*. Several long delays were experienced at harbors along the way on account of stormy weather. Detroit was finally reached on November 22, and the party was then disbanded.

Primary triangulation westerly from Straits of Mackinac.—The primary triangulation on the Great Lakes now includes a chain extending northerly from Chicago through the Green Bay region to Lake Superior, easterly around the north and east shores of Lake Superior and southerly across the Straits of Mackinac and down the westerly shore of Lake Huron to Lake Erie, where it connects with the east and west chain running to Chicago. The closure on this long loop shows a discrepancy of some 50 meters in position. The project provides for connections from the Straits of Mackinac to Green Bay and from Whitefish Bay to Grand Island, Lake Superior, dividing the present loop into three shorter loops. The work for the first named was begun in 1906. Starting off a line of the primary in Green Bay, the triangulation was carried across the lake to South Fox and North Manitou Islands, and a portion of the angles were read for extending it to the main land and Beaver Island. A reduction in the Lake Survey appropriations for the fiscal years 1907 and 1908 and, later, the addition of surveys of New York canals to the work of this office, caused an indefinite suspension of this triangulation. The New York surveys were completed during the past year, and the triangulation has now been resumed.

Mr. Johnson was employed from September 18 to October 11, 1916, in making a reconnaissance and outlining a plan for completing the triangulation westerly from the Straits of Mackinac. On May 13, 1917, a party took the field to begin this work. At the end of the fiscal year the party was just in readiness to begin angle reading, station building having been completed as follows:

- At Δ Mackinac Island, 70-foot station.
- Δ West Base McGulpin Point, 35-foot station.
- Δ Manitou Payment, 40-foot station.
- Δ Maple Hill, 70-foot station.
- Δ Pointe aux Chenes, target only.

Lake of the Woods.—The survey of the Lake of the Woods for charting purposes was begun in May, 1916, and at the beginning of this last fiscal year the field party had sounded an area of 66 square miles in Muskeg Bay reaching eastward to longitude $95^{\circ} 07'$ and northward to latitude $49^{\circ} 02'$. The work was continued to the northward after July 1 to include Buffalo Bay and as far as latitude

49° 11', and eastward to longitude 94° 52½' or to a line running south from the center of Garden Island. The sounding was on lines about 2,000 feet apart where the water was deep and the bottom uniform. In shoal water near shore, and on detached shoals, sounding lines were spaced close enough to obtain good delineation of the underwater contours. Five important shoals of rock or boulder formation were discovered. The area of hydrography after July 1 was 246 square miles. Locations for the sounding work were determined with sextants from shore signals or from buoys which had been located from the triangulation. The triangulation points established by the International Boundary Commissions were used for the most part, although it was found necessary to supplement them with a few tertiary points. A tripod 35 feet high was erected over station Long and one 55 feet in height over station Stony, both stations of the Boundary Commissions' survey. A new station, Jinx, required an observing tripod 50 feet high.

The harbor at Warroad was sounded to the head of navigation, and a topographic survey of the village was made.

Field work was suspended on October 30 and the launches and equipment were stored for the winter. The party then proceeded to Detroit, reaching there on November 6. The notes of the survey were reduced and plotted during the following winter on detail sheets which will be used in preparing the published maps. The projection for these sheets is taken from the triangulation work of the Boundary Commissions and the topography is transferred from published maps showing recent shore surveys made by the International Joint Commission.

The party again took the field on May 12, 1917. After a few days preparation, the work of sweeping over the shoals discovered during the previous season was begun. Considerable difficulty was experienced with one of the launches and pending the purchase of a new engine the sweeping was suspended and the sounding work taken up. This latter was in extension northward of the sounding area covered during 1916. Prior to July 1, areas of 2½ square miles had been swept and 16 square miles had been sounded, the latter extending northward to latitude 49° 15' and from the west shore eastward to longitude 94° 53'.

The work was in charge of Junior Engineer D. F. Jennings throughout the year.

Precise levels.—In May and June, 1917, a party from the Coast and Geodetic Survey office has been engaged in running lines of precise levels between Marquette and Escanaba and from Algonac to St. Clair Flats, Mich. This work was undertaken upon request of the Lake Survey and under arrangements whereby the two offices will share the expense. The details and the results have not yet been reported. The two lines of levels will complete the proposed geodetic leveling in the Great Lakes region and will form component parts of the level net of the United States.

INVESTIGATION OF LAKE LEVELS.

Water levels.—The stage of water in the lakes and in the interlake and outflow rivers has been recorded as heretofore by the regular series of self-registering gauges.

Including the St. Clair Flats gauge, which is maintained by the United States engineer office, Detroit, Mich., during the season of navigation and by this office during the winter, the Lake Survey now maintains 10 self-registering gauges and 1 staff gauge, as follows:

1. Lake Ontario, at Cape Vincent.
2. Lake Erie, at Buffalo.
3. Lake Erie, at Cleveland.
4. Detroit River, at Fort Wayne.
5. Lake St. Clair, at Windmill Point (staff).
6. St. Clair River, at head of St. Clair Flats Canal.
7. St. Clair River, at Port Huron.
8. Lake Huron, at Harbor Beach.
9. Straits of Mackinac, at Mackinaw City.
10. Lake Michigan, at Milwaukee.
11. Lake Superior, at Marquette.

The Lake Survey also operated an automatic gauge at Toledo Harbor Lighthouse during a portion of the past year, while field work was in progress at the west end of Lake Erie.

In addition, this office received records of the self-registering gauges maintained by the district offices, as follows: Detroit River at Amherstburg, Lake Michigan at Chicago, St. Marys River below the locks, and St. Marys River above the locks, and records of staff gauge readings on Lake Ontario at Oswego and on Lake Superior at Houghton and Duluth. The gauge which has been operated for several years on the south pier at Milwaukee was discontinued in November, 1916, after obtaining about six months comparison with the one established at the new location in the engineer warehouse near the northerly end of the breakwater.

The following table shows, for each of the Great Lakes, the monthly mean levels for the fiscal year, as determined from records of the standard gauges:

Monthly means of water level for stations named, expressed in feet above mean sea level.

[Adjusted levels of 1903.]

	1916					
	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Marquette.....	603.60	603.69	603.81	603.64	603.45	603.13
Milwaukee.....	581.31	581.06	580.67	580.50	580.65	580.56
Harbor Beach.....	581.10	581.06	580.85	580.58	580.64	580.58
Cleveland.....	573.22	572.82	572.29	571.89	571.67	571.52
Oswego.....	247.93	247.36	246.69	246.06	245.65	245.37

	1917					
	Jan.	Feb.	Mar.	Apr.	May.	June.
Marquette.....	602.75	602.39	602.32	602.25	602.35	602.51
Milwaukee.....	580.44	580.26	580.49	580.85	581.18	581.63
Harbor Beach.....	580.48	580.41	580.40	580.70	581.07	581.46
Cleveland.....	571.60	571.35	571.58	572.60	573.00	573.53
Oswego.....	245.26	245.06	245.17	246.24	246.51	246.98

The hydrograph showing the monthly mean water levels of all the Great Lakes from January, 1860, to June, 1917, inclusive, was brought up to date.

During the year there has been issued a series of notices to navigation interests giving the monthly mean stages for all the Lakes during the preceding month, comparing these stages with corresponding ones for critical years, and predicting the stages to be expected for the following month. These notices have been accepted as authoritative and of great usefulness.

HYDRAULICS.

No hydraulic measurements have been made during the past year. A study of St. Lawrence River hydraulics was continued and new formulas of discharge in terms of Lake Ontario stages have been derived embodying the results of all discharge measurements on this river. This study has also included the determination of relative fluctuations and corresponding stages at the various Canadian locks above Cornwall and the determination of accurate profiles of the river at mean stage and extreme low water.

The hydraulic work on the Great Lakes is considered complete for the present. The flow in the St. Marys River is undergoing change due to construction of remedial and regulating works at the head of the Rapids, and will probably soon be under complete control. The natural flow in the other rivers has been measured sufficiently to determine with precision the laws of discharge under present conditions of regimen. Any change in the regimen from either natural or artificial causes will, of course, require additional measurements, but none are foreseen at present. The latest discharge equations for the several connecting and outflow rivers are given on page 1928 of this report.

MISCELLANEOUS.

The taking of air and water temperatures was continued during the field seasons by the steamer parties engaged on hydrographic work.

The table giving a summary of discharges from the several lakes, determined by the formulas noted above, corresponding to the mean elevations for the last 57 years, was revised to include the calendar year 1916, and is printed on page 1928.

PLANT.

The floating plant of the survey consists of five small steamers, three of which are equipped with launches for use on sweeping operations. None of the steamers was originally built for survey work, but by alterations and improvements from time to time all have been made fairly serviceable. As usual with old floating plant, the annual cost of repairs is a considerable item of expense.

Repairs to steamers and launches during the year have been limited to replacements and repairs necessary for maintenance. These included renewal of small sections of deck and planking on the steamers *Col. J. L. Lusk* and *Surveyor*, and on several of the launches, and quite extensive repairs to the boiler on the steamer *Surveyor*.

The rebuilding of the lake survey dock at the Fort Wayne Military Reservation, which was undertaken in June, 1916, was completed in July, 1916.

APPROPRIATIONS.

The aggregate amount of appropriations for survey of northern and northwestern lakes prior to the adoption of the present project is \$3,977,379. (See list, p. 8390, Annual Report for 1914.)

Appropriations under the existing project are as follows:

Mar. 4, 1907	\$75,000.00
May 27, 1908	125,000.00
Mar. 4, 1909	125,000.00
June 25, 1910	125,000.00
Mar. 4, 1911	125,000.00
Aug. 24, 1912	125,000.00
June 23, 1913	125,000.00
Aug. 1, 1914	125,000.00
Mar. 3, 1915	125,000.00
July 1, 1916	125,000.00
June 12, 1917	125,000.00
Total	1,325,000.00
Total of appropriations under all projects	5,302,379.00
Amounts carried to surplus fund of the Treasury	3,008.54
Net total of appropriations	5,200,370.46
13751—Aug 1917—237	

**IMPROVEMENT OF YELLOWSTONE NATIONAL PARK, INCLUDING
THE CONSTRUCTION, REPAIR, AND MAINTENANCE OF ROADS AND
BRIDGES.**

REPORT OF LIEUT. COL. AMOS A. FRIES, CORPS OF ENGINEERS.

[NOTE.—This report is submitted on behalf of Lieut. Col. Amos A. Fries, Corps of Engineers, in charge of the work of improvement in the Yellowstone National Park during the fiscal year ending June 30, 1917, by Capt. John W. N. Schulz, Corps of Engineers, who was the military assistant to Lieut. Col. Fries during the fiscal year ending June 30, 1917, and who relieved Lieut. Col. Fries of the charge of the work on July 10, 1917.]

The work during the fiscal year ending June 30, 1917, was executed under appropriation approved July 1, 1916. This work consisted generally of the maintenance, repair, and reconstruction of existing roads and bridges, and in new construction work on the west, south, and east approaches to the belt line, to improve those roads so as to make them suitable and safe for animal-drawn and motor-propelled vehicles, as provided for in the above and four preceding acts.

ORGANIZATION.

Sections.—Upon beginning work in the spring of 1915 the roads in Yellowstone Park and the forest reserves east and south of the park were divided into four sections, with an engineer or overseer in charge of each section. These sections were known as the northern, western, eastern, and central sections. So far as conditions and the money available would allow, the work in the different sections was equalized. Under each section engineer there were from two to five foremen in charge of parties, besides the sprinkling crews during the tourist season. This organization has proven very efficient, but with the approaching completion of the work of widening and improving the eastern, western, and southern entrances the number of sections was reduced for the season of 1916 to three.

Timekeepers.—Timekeepers have been, since the spring of 1915, responsible only to the section engineers and the headquarters' office. This was for the purpose of getting an independent check of time, materials, and work. It was found advisable to install during the season of 1916 a general timekeeper at headquarters, whose duty it is to keep the time of employees at Mammoth Hot Springs and of isolated employees in the park not attached to any regular crew.

Office and storehouse.—Notwithstanding the office and storehouse forces were increased considerably in 1915 over previous years, they proved too small to keep the work up to date. Consequently, for the season of 1916 the clerical force was increased to one chief clerk and four other clerks, while the storekeeper was given two assistants, with other help as needed from time to time to receive and check supplies and stores. Inasmuch as all animals are foraged and all employees subsisted, the value of stores and supplies passing through the hands of the storekeeper is nearly 20 per cent of the entire appropriation.

MACHINERY AND EQUIPMENT.

The principal additional machinery purchased during the fiscal year 1917 consisted of the following:

- One 3-yard steam shovel.
- Two 5½-ton trucks, with 4-cubic yard automatic steel dump bodies.
- Four passenger-carrying automobiles for inspection purposes.
- One oxy-acetylene welding and cutting outfit.
- One 12-ton road roller.
- One power grader.
- Two 4-cubic yard steel dump trailers.
- One 1,000-gallon asbestos-lined oil tank, with pump and distributor for applying hot asphalt oil.

The principal items of machinery which are being purchased during the fiscal year 1918 are as follows:

- Two 2-ton express trucks.
- One inspection car.
- One 75-horse-power caterpillar tractor.
- Six 3½-cubic-yard steel dump trailers.

Fuel.—There are now under this office a number of steam-driven and also a number of gasoline or kerosene driven pieces of machinery. During the last several years the relative conditions as to cost of fuel have changed considerably. Gasoline has practically doubled in price, thus making distillate comparatively much cheaper than it was two years ago. For that reason distillate is now being used in all the machines which are fitted for the use of either gasoline or distillate. The price of coal has also increased very considerably, thus making necessary the use of wood, wherever possible, in steam-driven machines. Some difficulty has also been experienced in the setting of forest fires by the use of steam-driven machines, especially steam rollers; and this is an additional reason for the use of internal-combustion engines in the park.

RATIONS.

After a number of changes the ration as now furnished seems to be sufficient and usually very satisfactory, though the cook is the final important factor. One of the greatest difficulties with rations is to prevent waste in camps, a condition that has been bettered greatly by a close checking of the number of men fed and the number of rations issued, and bringing this knowledge to the attention of the cooks, timekeepers, and foremen, all of whom share in responsibility for the rations.

SUMMARY OF WORK ACCOMPLISHED.

BRIDGES AND CULVERTS COMPLETED DURING THE YEAR.

Bridges and culverts were constructed during the year as listed in the report of the Chief of Engineers, United States Army, for this fiscal year, pages 1945 and 1946.

BELT LINE.

General road repairs.—Owing to the very heavy snows of the winter of 1915-16 and to the late spring, the road over the Continental Divide, between the Upper Basin and the Thumb, was still impassable on account of the snowdrifts as late as June 15, 1916, and would have remained so for the first part of the tourist season, except for work done voluntarily on the part of the transportation companies and others in shoveling and otherwise breaking a trail through the snow. While this work served to render the road passable for horse-drawn vehicles for the first tourists on June 17, 1916, much sooner than would have been the case through the regular seasonal thaw, it also had the effect of permitting the passage of traffic through numerous snowbanks, the continuous melting from which kept the roadbed in wet and poor condition. That, combined as it was with restricting the travel to a narrow, single track, caused severe rutting of the roadbed, and required considerable urgent repair work to keep the road from becoming impassable. The same was true of the Dunraven Pass road from the Canyon to Tower Falls, and of parts of the east approach road in the park, especially near Cub Creek, although both of these roads were not opened up until about July 1, several weeks later than the Continental Divide road.

The spring run-off from the deep snows of the winter also caused some washing out of roads over certain stretches, especially along Spring and Dry Creeks, between the Upper Basin and the Thumb, and required the constant attention of a small maintenance crew during the early part of the tourist season.

Early in July, 1916, two flying grader squadrons, consisting of about three graders each, with a few extra laborers, were sent in opposite directions around the belt line, starting from Mammoth Springs. These crews shaped the roads, repaired washouts, cleaned out ditches, and cleaned out and made minor repairs to culverts. In addition, a special crew was necessary to repair the 6 miles of road between Gibbon Meadows and Yellowstone Junction, which had become very badly broken up with ruts and chuck holes. Bad chuck holes between Mammoth Springs and the 15-mile post on the road to Norris were repaired by an emergency crew of about three men sent out from Mammoth Springs in a Ford touring car, which was temporarily impressed into service as an emergency repair car.

To assist in maintaining the roads during the tourist season each sprinkler crew was equipped with a split-log drag, and whenever rainy weather, which was rare during the season of 1916, gave an opportunity for so doing these drags were used to reshape and smooth the ruts in the roads. This process is very necessary and would have been more efficacious had there been more rain than was the case during the season of last year.

Sprinkling and dragging.—During the tourist season of 1916 a maximum of 107 miles of road was sprinkled, covering practically the same stretches of road as the previous season and including a portion of the north and west approaches. Although water for sprinkling purposes was plentiful early in the tourist season, continued dry weather during the summer caused some of the wells from which water for sprinkling was drawn to go dry, so that toward the end of the season it was found necessary to abandon several sprinkler runs, as was the case in 1915. As already stated under "General road repairs," all sprinkler crews were equipped with split-log drags, which were used whenever rainy weather gave an opportunity for doing so, to reshape and smooth out the roads. During the present spring, due to urgent emergency work required to keep the belt line passable, it was impossible to start up sprinkling operations prior to the end of the fiscal year.

Firehole River realignment.—This realignment, which will replace several miles of the road lying between the Madison Junction and the Firehole Cascades, was begun in June, 1915, and completed during the season of 1915 for a distance of about 3,500 feet. Work was resumed about the middle of July of last year, and during last season about 1,200 feet additional was completed, making the total completed distance about 4,700 feet. Partial work was done for 300 feet additional. This new location involves heavy rockwork, but it will greatly improve the grades and will open up a fine stretch of river scenery, replacing with an unusually attractive road the present one, which is uninteresting. The construction of this new road has been greatly assisted by the installation on the work during the 1916 season of a three-fourths cubic yard revolving steam shovel, which serves to materially reduce the cost of handling the rock material after being loosened by blasting. It is expected that the realignment, the total length of which will be about 7,650 feet, will be completed during the fiscal year 1918.

Gibbon Canyon.—Two miles of the road along the Gibbon River between the 10 and 12 mile posts from Norris toward Madison Junction was reshaped and regraded during the 1916 season, including two short realignments (300 and 600 feet long, respectively), and the installation of about four corrugated-iron culverts.

Vicinity of Lake Hotel.—The first 5 miles of the road from the Lake Hotel toward the canyon and several miles of the road from the Lake Hotel toward the Thumb was reshaped and regraded in the summer of 1916. Twenty-six corrugated galvanized-iron culverts, mostly of 24-inch diameter, were installed in connection with this work.

Freight road, Lower Geyser Basin.—The freight road, 4 miles long, which parallels the mail belt-line road between the Fountain Soldier station and the Excelsior Geyser, having been closed by reason of the unsafe condition of the wooden-truss bridge over the Firehole River, about 1 mile from the Fountain Soldier station, it was found desirable in 1916 to reconstruct the bridge in question and also to generally put the road in shape for traffic. In addition to the reconstruction of the bridge already named, the trusses of which were so weak that they collapsed during the building of the new 50-foot bridge, there was also reconstructed the 40-foot bridge over Nez Perce Creek, in the immediate vicinity of the Fountain Soldier

station. The putting of this road into commission again made possible deviating over it considerable heavy freighting traffic, thus reducing the wear on the main road between the Fountain Soldier station and Excelsior Geyser, and furnishing a shorter route for freight traffic, and also gave opportunity for greater freedom during the season of 1916 in handling automobile traffic past the Fountain Geyser Basin without interference with horse-drawn traffic.

Resurfacing.—No resurfacing was done on the belt line during the season of 1916. Two automobile dump trucks were purchased and received, but were used on the west approach for hauling surfacing material there. In order to take advantage of the cheaper hauling costs, such surfacing as was contemplated on the belt line was delayed until such time as these trucks would be free to do the work, as the expense of hauling is much less by truck than by team, and by the use of trucks it is therefore possible to surface well and at reasonable cost stretches of the road system which heretofore it has been impracticable to surface except with the poorer materials immediately at hand.

Bridges and culverts.—In line with the policy adopted several years ago of reconstructing with permanent materials the bridges and culverts on the main belt line, there were built or installed in 1916 on the sections of road between the Thumb and the Lake, and between the Lake and the Canyon, seven reinforced-concrete-slab culverts, four of which were of 8-foot span, one of 6-foot span, two of 3-foot span, and one double corrugated galvanized-iron culvert, 24-inch diameter, with concrete headwalls. Some of the foregoing structures require still to be backfilled in order to be placed in commission. Concrete handrails were added to the 26-foot double-span reinforced-concrete culvert built in 1914 over Otter Creek, about 2 miles from the Canyon Junction on the road to the Lake Hotel. There were also installed a number of galvanized-iron culverts at other parts of the belt line of 12, 18, and 24 inches diameter, as already noted in connection with the reshaping of roads in the vicinity of the Lake Hotel and between mileposts 11 and 13 from Yellowstone toward Norris, and also in the replacement of small wooden and tile culverts at other parts of the belt line where they had been broken down and rendered unserviceable by the heavy automobile-truck traffic over them last season. In addition, a number of culverts and small wooden bridges were repaired, strengthened, or reconstructed, principally on the road between the Canyon and Tower Falls, many of those being partially or entirely broken down by the automobile traffic. The 410-foot span steel bridge over the Gardiner River, on the road from Mammoth Springs to Tower Falls, and the 150-foot span steel bridge over the Madison River, $7\frac{1}{2}$ miles from the west entrance, were refloored with lumber. During the present spring it has been necessary to construct several temporary bridges, the largest span being about 20 feet, where required to make emergency repairs to places washed out by the heavy run-off from melting snows.

Guard rails and retaining walls.—Minor repairs were made to retaining walls as needed. There was installed 180 linear feet of log guard rail at the east approach to the Chittenden Bridge over the Yellowstone River at the Canyon.

Repairs in spring of 1917.—Repair work done during the present spring has consisted almost entirely of emergency work, as described in the annual report of the Chief of Engineers, fiscal year 1917, pages 1947 and 1948.

NORTH APPROACH.

On the north approach road, extending from the northern entrance at Gardiner, Mont., to the belt line at Mammoth Hot Springs, general maintenance and repair work was done, as on the belt-line road itself, during the 1916 season, and the first $3\frac{1}{2}$ miles from Mammoth Hot Springs toward Gardiner was sprinkled. The other mile and a half of the road had been treated with a light oil and sand finish in the spring of 1915 and did not require sprinkling during the season of last year. During the present spring about 300 feet of road was resurfaced with gravel at the entrance to the freight road at Gardiner.

Gardiner slide.—The slide in the Gardiner canyon, about 2 miles from the north entrance at Gardiner, Mont., which has given considerable trouble to the Gardiner road for a number of years, was cut back in the fall of 1914, in the spring of 1915, in the spring and fall of 1916, and again during the present spring. The work done during the fiscal year just closed has cost almost \$6,000. The annual cost for the slide removal is becoming rapidly greater, and, as indicated in the annual report of the Chief of Engineers for the fiscal year 1917, pages 1953 and 1954, it will be necessary in the near future to build a new road to obviate passing this slide.

Retaining wall, Gardiner slide.—Both in the spring of 1916 and the spring of 1917 trouble has been had in holding the retaining wall which protects the Gardiner road in the vicinity of the Gardiner slide. Considerable undermining and breaking of the wall occurred in both springs due to the melting of the heavy snows of the preceding winters, the trouble being increased because of the pressure of the slide and at places because of the weakening of the wall by blasting operations in connection with the slide removal. This wall is urgently in need of complete repair or replacement, but as it is contemplated to relocate the road in the early future, if Congress sees fit to appropriate the money for this purpose, all but the most necessary work on the retaining wall is being put off in order to spare heavy expense at a section of road which will probably be shortly abandoned.

WEST APPROACH.

On the west approach road, which extends from the west entrance at Yellowstone, Mont., to the belt line at Madison Junction, a distance of $13\frac{1}{2}$ miles, maintenance work similar to that on the belt line, including sprinkling the $3\frac{1}{2}$ miles nearest to Madison Junction, was done. In addition, the work of widening, surfacing, and otherwise improving the road to make it safe for animal-drawn and motor-propelled vehicles was prosecuted throughout the season of 1916 and as early in 1917 as the weather would permit.

Widening and grading.—During the year widening and grading of the west approach was extended to include the entire distance from Yellowstone to Madison Junction, the work done this year covering about 2 miles between the 11 and 13 mile posts from the west entrance.

Surfacing.—During the season of 1915 oil-macadam surfacing, 18 feet wide, was completed for the first 5 miles of the approach, beginning at the west entrance. During the present year a crushed rock subbase, 5 inches deep and 10 feet wide, finished with a single coat of 90 per cent asphalt oil and covered with sand and rolled, has been constructed a distance of about $3\frac{1}{2}$ miles, reaching as far as $8\frac{1}{2}$ miles from the west entrance. Unfortunately, the long and hard winter made it impossible to complete the surfacing of the entire road during the fiscal year, and reappropriation has therefore been requested of the balance of funds for this especial purpose which remained unobligated at the end of the fiscal year. The narrowing of the oil macadam from 18 to 10 feet was made because experience to date has shown that practically all traffic on the west approach is concentrated on the 10-foot strip, and the expense of the greater width in further construction on the west approach, at least for the immediate future, is not considered justified. To haul the oil for the oil finish there was purchased a 1,000-gallon asbestos-covered oil tank and distributor. This tank is temporarily mounted, whenever necessary for oiling operations, on the White 5-ton truck purchased in 1915. This equipment will permit oiling of roads at considerable distances from the railroad without undue expense of hauling, and without the necessity of reheating the oil en route. Two $5\frac{1}{2}$ -ton dump trucks were also purchased to permit the more economical hauling of crushed rock and other surfacing material on this and other work in the park. Both trucks were in the past fiscal year used on the west road.

SOUTH APPROACH IN THE PARK.

In addition to general repairs, such as were made on the belt line, the work of widening and improving the south approach for combined horse-drawn and automobile traffic, as specially appropriated for by Congress, was continued. Unfortunately, the long and hard winter made it impossible to complete the improvement of the entire road during the fiscal year, as was contemplated. The reappropriation has been requested of the balance of funds for this special purpose which remains unobligated at the end of the fiscal year. On July 1, 1917, the road was still closed by snow.

Widening and grading.—The widening and grading of about $1\frac{1}{2}$ miles of road between 6 and 8 miles from the Thumb Soldier station, which was begun during the season of 1915, has now been finished, and in addition the road has been widened and graded for a distance of about $5\frac{1}{2}$ miles over the Pitchstone Plateau, covering a stretch located between 16 and $21\frac{1}{2}$ miles from the Thumb Soldier station. This latter work was difficult, the plateau being strewn with large and small boulders, and the improvement included several minor realignments where better grades and curves could thus be obtained, or where the road could be built more economically on the new location. In doing this work there was used to advantage a heavy power grader drawn by a steam roller acting as a tractor, both of which were purchased in the fiscal year just closed. To complete the improvement of the south approach there is yet required the widening and grading of about 2 miles of road (14 to 16 miles south of the

Thumb). This work will not be completed until the funds therefor are reappropriated by Congress.

Bridges and culverts.—The Moose Falls bridge, about 1½ miles from the south entrance, was redecked, and two small log bridges were constructed, one about a mile south of the Thumb Soldier station, and the other, a 12-foot span bridge, about 4 miles south of the soldier station. In addition, repairs were made to other log culverts where necessary, and several small log and corrugated-iron culverts were installed in connection with the widening and grading work reported above.

Realignment 4 miles south of Thumb.—A short realignment, 400 yards long, about 4 miles south of the Thumb, was constructed, including the 12-foot log bridge reported above.

SOUTH APPROACH IN THE FOREST RESERVE.

Snake River bridge.—During the season of 1916 the steelwork was erected for the 100-foot span steel bridge over the Snake River, 2½ miles south of the park boundary, the reinforced concrete floor and the approaches were constructed, and the bridge put into service. Owing to the very poor condition of the old wooden bridge over the Snake River it was very urgent that the new bridge be placed in commission at the earliest possible moment.

Dugway realignment.—A realignment about seven-eighths mile long, between approximately 5 and 6 miles south of the park boundary, to replace the very bad stretch of road there known as the Dugway, was constructed in the summer of 1916. This realignment includes the construction of a 70-foot span log bridge and of a number of small log culverts.

General repairs.—In addition to the more important work in the south forest reserve already noted, considerable work of a general maintenance and repair nature was done to the first 7 miles south of the park boundary. On July 1, 1917, this road was still closed because of the snow on the south approach inside the park.

EAST APPROACH INSIDE THE PARK.

General repairs.—General repairs were made where necessary throughout the entire 26 miles of the east approach inside the park. Constant attention was required early in the tourist season of 1917 to keep the east approach passable, owing to the melting snow banks and to the single, narrow track which had been opened through the snow and to which traffic was for the time being restricted. At the end of the fiscal year, July 1, 1917, this road was still blocked by snowdrifts.

Bridges and culverts.—The so-called Loop Bridge, east of Sylvan Pass, was replaced by a 60-foot span wooden bridge and a large rock fill at the west abutment of the bridge. The bridge over Pelican Creek was partially refloored, and numerous other smaller bridges and culverts received repairs made necessary by the heavy run-off from the winter snows in 1916 and by the traffic of automobile trucks and of the heavy transportation autos entering the park from the Cody entrance. There were also installed a number of galvanized

iron culverts in connection with the widening and grading work hereafter described.

Widening and grading.—The work of widening and improving the road to make it safe for both animal-drawn and motor-propelled vehicles under the special appropriation for this purpose was resumed as soon as the new funds became available in July, 1916. The work done during the present year consisted principally of widening, reshaping, and regrading about $1\frac{1}{2}$ miles of road just east of Sylvan Pass. The improvement of the east approach has now been brought to completion on all except about 3 miles of the road, between the $9\frac{1}{2}$ and $12\frac{1}{2}$ mile posts east of the Lake Junction. This 3 miles has also been partially widened and improved. Unfortunately, the long and hard winter made it impossible to complete the improvement of the entire road during the fiscal year, as was contemplated, and the reappropriation of the balance of funds for this purpose which remained unobligated at the end of the fiscal year has been requested.

EAST APPROACH IN THE FOREST RESERVE.

Widening and grading.—The work of improving the road in the east forest reserve to make it safe for both animal-drawn and motor-propelled vehicles under the special appropriation for the purpose was resumed in July, 1916, and during the fiscal year the $2\frac{1}{2}$ miles between the 5 and $7\frac{1}{2}$ mile posts from the park boundary was widened and graded, thus completing the work of widening and grading for the entire $27\frac{1}{2}$ miles of the road.

Steel bridges.—The three bridges, of 100-foot span each, over the North Fork of the Shoshone River at Pahaska, $2\frac{1}{4}$ miles east of the park boundary; over the North Fork of the Shoshone River, $21\frac{1}{2}$ miles east of the park boundary; and over the Elk Fork of the Shoshone River, 23 miles east of the park boundary; which were begun in 1915, were completed during the fiscal year just closed, and were all put in service. These bridges were badly needed, as the old wooden bridges which they replaced were in poor shape. The work during the fiscal year consisted of constructing the reinforced concrete floor and the approaches for the Pahaska Bridge, and painting the steelwork: of erecting and painting the steelwork for the North Fork Bridge, $21\frac{1}{2}$ miles from the park boundary, and constructing the reinforced concrete floor and the approaches for the same (approaches are serviceable but further completion work will be necessary in the future); and of painting the Elk Fork Bridge and constructing its earth approaches (approaches are in serviceable condition but will require further finishing work in the future). There was also constructed a 30-foot span steel I-beam bridge, with concrete abutments and reinforced concrete floor, over Clearwater Creek about 19 miles from the park boundary; and the concrete abutments were constructed for a similar bridge over Grinnell Creek, about 4 miles from the park boundary. In addition, several corrugated galvanized iron culverts were installed, and repairs were made as necessary to the few remaining wooden bridges in the forest reserve.

General repairs.—General repairs were made to the road in the east forest reserve wherever required. The road was repaired and reshaped more extensively between the park boundary and the present

season's widening work, about 5 miles from the boundary. A 1,050-foot realignment, made necessary by the encroachment of the North Fork of the Shoshone River, was constructed about $4\frac{1}{4}$ miles east of the park boundary. There was also constructed 220 linear feet of crib revetment 5 miles east of the park boundary, and 330 feet of crib revetment $13\frac{1}{4}$ miles from the park boundary to protect the road at the points named from encroachments by the river. Three-tenths mile of road was surfaced between 5 and 5.3 miles east of the park boundary.

COOKE CITY ROAD.

Bridges and culverts.—Fourteen galvanized-iron culverts and one log culvert were installed on the road leading from Tower Falls Soldier station to the northeast boundary of the park between the Lamar River Bridge and the Buffalo Farm, about 4 and 12 miles, respectively, from the Tower Falls Soldier station.

Twin Lakes realignment.—During the fiscal year there was constructed a realignment, about 3 miles long, of the road just east of the crossing of the Yellowstone River. This realignment, which passes to the south of the so-called Black or Junction Butte, replaces a portion of the road which was replete with bad grades and curves, and some parts of which during the spring of the year have at times been almost impassable because of the mud. The work included the installation of a number of galvanized-iron culverts.

Work by Robert I. McKay.—The work done by Mr. Robert I. McKay and associates, who have mining interests at Cooke City, Mont., about 4 miles outside the northeast boundary, has consisted principally of spring repair work the present spring. Mr. McKay and his associates are interested in the upkeep and improvement of the road for the benefit of their motor trucks and trailers, for the operation of which, between Cooke City and Gardiner, Mont., for the hauling of ore, Mr. McKay has a permit from the Interior Department.

COST OF WORK ON DIFFERENT SECTIONS OF ROAD, FISCAL YEAR 1917.

MAINTENANCE AND REPAIR.

Roads in park, 293 miles:

Headquarters, general railroad and park freight and express, and general hardware and other supplies.....	\$20,038.2
Property, plant, and equipment.....	18,805.3
Dust prevention, sprinkling about 107 miles with water.....	13,061.9
Road surface, maintenance and repair, summer 1916.....	9,044.9
Bridges, maintenance and replacement of.....	11,926.2
Retaining and guard walls, clearing roads, protecting against slides, and resurfacing.....	14,322.6
Realignment, regrading, and widening.....	5,182.1
Continuation of Firehole River realignment.....	18,654.7
Spring repairs, spring 1917.....	2,122.3
Stage platforms, board walks, shrubbery.....	853.5
Forage, rations, supplies, materials, etc., remaining on hand.....	14,083.7

127,593.9

Forest reserve road east of park, 28 miles:

Headquarters, general railroad and park freight and express, and general hardware and other supplies.....	\$3, 152. 82
Property, plant, and equipment.....	530. 22
Maintenance and repair of roadway, bridges, and culverts.....	4, 741. 78
Part cost of replacing three wooden bridges with steel (100-foot spans).....	3, 807. 52
Replacing one wooden bridge with steel I beams and concrete (80-foot span) and constructing abutments for another similar bridge.....	2, 767. 68
	<u>15, 000. 00</u>

Forest reserve road south of park, 26 miles:

Headquarters, general railroad and park freight and express, and general hardware and other supplies.....	\$1, 962. 52
Property, plant, and equipment.....	993. 06
Maintenance and repair of roadway, bridges, and culverts.....	4, 659. 01
Part cost of replacing one wooden bridge with steel (100-foot span).....	2, 385. 41
	<u>10, 000. 00</u>
Total for maintenance and repair.....	<u>152, 593. 91</u>

WIDENING AND IMPROVING ROADS FROM THE BELT LINE TO THE WESTERN, SOUTHERN, AND EASTERN BORDERS.

West approach (\$9,992.85):

Headquarters, general railroad park freight and express, and general hardware and other supplies.....	\$1, 959. 35
Widening, completion of 2 miles.....	970. 04
Oil-macadam finish, $4\frac{1}{2}$ miles, and part cost of rock base for same.....	6, 062. 98
Property, plant, and equipment.....	1, 000. 00

South approach (\$9,251.29):

Headquarters, general railroad park freight and express, and general hardware and other supplies.....	1, 819. 66
Widening, grading, and improving $5\frac{1}{2}$ miles and completing widening, grading, and improving $1\frac{1}{2}$ miles.....	5, 749. 47
Bridges and culverts.....	782. 18
Property, plant, and equipment.....	900. 00

East approach (\$10,040.75):

Headquarters, general railroad park freight and express, and general hardware and other supplies.....	1, 969. 89
Bridges and culverts.....	3, 611. 81
Surfacing 600 linear feet of road.....	184. 97
Widening and improving $1\frac{1}{2}$ miles of road and partially widening and improving 1 mile of road.....	3, 274. 08
Property, plant, and equipment.....	1, 000. 00
	<u>29, 284. 89</u>

WIDENING AND IMPROVING THE EAST APPROACH IN THE FOREST RESERVE.

Headquarters, general railroad park freight and express, and general hardware and other supplies.....	\$700. 00
Part cost of replacing wooden bridge at Pahaska with steel (100-foot span).....	1, 000. 00
Widening and improving $2\frac{1}{2}$ miles and surfacing one-fifth mile of road.....	3, 700. 00
Property, plant, and equipment.....	600. 00
	<u>6, 000. 00</u>
Total for widening and improving.....	<u>35, 284. 89</u>
Total for maintenance and widening and improving.....	<u>187, 878. 30</u>

3756 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1917.

Total expenditures during fiscal year 1917-----	\$183,860.02	
Plus outstanding liabilities June 30, 1917-----	20,068.18	
		\$203,929.
Less outstanding liabilities June 30, 1916:		
Amount reported June 30, 1916-----	\$8,629.70	
Less revisions since-----	48.36	
		8,581.34
Less refunds and receipts for sales and transfers-----		5,279.12
Less Weather Bureau repairs for the Department of Agriculture, and reimbursed-----		150.12
Less services and materials furnished United States Geological Survey in connection with current and gauge installations, and reimbursed-----		173.03
Less services rendered Interior Department in connection with fighting forest fire, and reimbursed-----		277.27
Less regrading grounds of Weather Bureau, to be reimbursed-----		54.00
Less hauling done for Interior Department, to be reimbursed-----		152.95
Less repairs to buildings for Quartermaster Department, to be reimbursed-----		91.62
Less sales and other items, to be reimbursed-----		1,291.35
		16,050.
		187,878.

APPROPRIATIONS.

Act.	Administration and protection.	Roads and bridges.	Total.
Total of appropriations to Dec. 31, 1902 (see H. Doc. No. 421, 57th Cong., 2d sess.)-----	\$100,348.02	\$1,008,586.23	\$1,108,934.25
Mar. 3, 1903-----	5,000.00	250,000.00	255,000.00
Apr. 28, 1904-----	7,500.00	250,000.00	257,500.00
Mar. 3, 1905-----	7,500.00	133,000.00	140,500.00
June 30, 1906-----	7,500.00	85,000.00	92,500.00
Mar. 4, 1907-----	8,000.00	75,000.00	83,000.00
May 27, 1908-----	10,500.00	65,000.00	75,500.00
Mar. 4, 1909-----	8,000.00	65,000.00	73,000.00
June 25, 1910-----	8,500.00	75,000.00	83,500.00
Mar. 4, 1911-----	8,500.00	70,000.00	78,500.00
July 1, Aug. 1 and 16, 1912-----		11,666.66	11,666.66
Aug. 24, 1912-----	8,500.00	165,333.34	173,833.34
June 23, 1913-----	8,500.00	200,000.00	208,500.00
June 30 and July 16, 1914-----		16,666.67	16,666.67
Aug. 1, 1914-----	8,500.00	223,333.33	231,833.33
Mar. 3, 1915-----	8,500.00	195,000.00	203,500.00
July 1, 1916-----	8,500.00	197,200.00	205,700.00
June 12, 1917-----	8,500.00	167,500.00	176,000.00
	216,348.02	3,238,286.23	3,454,634.25
Less amount reverted to Treasury, July, 1904, appropriation 1901-2-----		621.22	621.22
Net total-----	216,348.02	3,237,665.01	3,454,013.03

HISTORICAL SUMMARY GIVING SCOPE OF PREVIOUS PROJECTS FOR THE IMPROVEMENT OF YELLOWSTONE NATIONAL PARK.

HISTORY.

The Yellowstone National Park was set apart from the public domain and placed under the control of the Secretary of the Interior by act of Congress March 1, 1872. The sundry civil act of March 3, 1883, directed the construction and improvement of suitable roads and bridges under the supervision of an Engineer officer to be detailed by the Secretary of War. The first detail was made in July

that year and marks the beginning of systematic road construction in the park. Work previous to this time consisted in the opening of such rough trails as limited funds permitted. These trails were temporary in character and of little or no value to the permanent system. Following the sundry civil act of August 4, 1886, the appropriation for improvement of roads and bridges was transferred to the War Department; and with the exception of the period from August, 1894, to March, 1899, has been in charge of the Engineer Department ever since.

Appropriations for a number of years prior to 1912 were entirely inadequate for maintenance, and as deterioration was cumulative, the need of large appropriations became more urgent each year until conditions reached a point where the safety of tourists became a matter of grave concern. The appropriation for the fiscal year 1912 was exhausted in the fall of 1911, leaving no funds available for repairs to the roads before the opening of the tourist season of 1912. Appropriations were made by joint resolutions of July 1, August 1, and August 16, 1912, but they were insufficient for needed work during the summer. The annual reports of the Chief of Engineers had for several years called attention to the need of large appropriations for maintaining the park improvements, for making good the progressive deterioration of the road system and for repairing and replacing old and unsafe structures. The sundry civil act of August 24 appropriated sufficient funds to carry on necessary work to the end of the fiscal year 1913, and the appropriation of June 28, 1913, was large enough to go far toward the replacement of unsafe bridges and retaining walls and to begin resurfacing the roads.

More extended information relating to previous operations is published in the annual reports of the Chief of Engineers, as follows:

- 1887, page 3138: A résumé of operations from 1883 to 1887.
- 1900, page 5420: A general résumé covering the period 1872-1900.
- 1900, page 5441: The general plan approved August 27, 1900.
- 1901, page 3797: Modification of 1901 in the general plan of August 27, 1900.
- 1903, page 2444: General description and technical details of work.
- 1905, following page 2822: Map of tourist routes.

PREVIOUS PROJECTS.

Belt line and approaches.—At the outset the officer of the Corps of Engineers in charge adopted a project (described in the Annual Report of the Chief of Engineers for 1887, p. 3134) for a comprehensive system of substantial roads, which, as modified by act of Congress March 3, 1891, is the basis of the present system. The sundry civil act of June 6, 1900, directed "that road extensions and improvements shall hereafter be made in said park under and in harmony with a general plan of roads and improvements to be approved by the Chief of Engineers." A plan approved August 27, 1900, and modified July 22, 1901, and again on July 2, 1902, was practically finished during the fiscal year ending June 30, 1906. It consisted of a belt line or main circuit, reaching all the important centers of interest, with side roads, bridle trails, and four approaches leading from the park boundary to different points on the belt line, making in all about 350 miles of road and about 125 bridges. The maximum grade was 8 per cent, and the standard width 18 feet. Most of the main circuit was surfaced with the best material found close by.

CRATER LAKE NATIONAL PARK.

REPORT OF COL. GEORGE A. ZINN, CORPS OF ENGINEERS.

The field operations during the fiscal year were carried on by a hired-labor force, varying from a few men and teams at the first and last parts of the season to a maximum of about 175 men and 25 teams for a short time during the middle of the season. Owing to stormy weather active field operations were suspended the 1st of November, 1916, and not resumed until the latter part of May, 1917. The work accomplished during the fiscal year consisted of clearing, grading, and draining 2.9 miles (3.46W to 6.34W) miles of the Rim Road; cross draining 6 miles (miles 10-16) of the Rim Road; the construction of one log bridge on the Medford Road at Little White Horse Creek; the maintenance of roads previously constructed; and surveys of the roads constructed during the year.

CONSTRUCTION COSTS, FISCAL YEAR 1917.

Rim Road, miles 3.46W to 6.34W, and 10 to 16, cross drainage only:	
Clearing, 0.7 mile	\$827. 34
Grading, class 1, earth, 10,742 cubic yards	6, 674. 73
Grading, class 2, loose rock, 4,615 cubic yards	6, 609. 25
Grading, class 3, solid rock, 3,892 cubic yards	6, 892. 78
Cross drainage (corrugated-iron culverts), 13 only	563. 91
Engineering and administration expense	3, 514. 90
Total for Rim Road	25, 082. 91
Medford Road, mile 3:	
Cross drainage, Little White Horse Creek Bridge, 1 log bridge	176. 47
Engineering and administration expense	28. 76
Total for Medford Road	205. 23
Watchman Trail:	
Grading only	118. 95
Maintenance of roads:	
Rim Road, regrading and rerolling 16 miles	2, 487. 98
Pinnacles Road, regrading and rerolling, 3.24 miles	272. 73
Fort Klamath Road, regrading and rerolling, 11.45 miles	1, 821. 20
Medford Road, regrading and rerolling, 6.84 miles	1, 119. 48
Engineering and administration expense	932. 00
Total expenditures for maintaining roads	6 633. 39
Summary:	
Rim Road	25, 082. 91
Medford Road	205. 23
Watchman trail, grading only	118. 95
Maintenance of roads	6, 633. 39
	32, 040. 48
Miscellaneous expenditures, engineering, etc., not prorated above	3, 808. 18
Total actual cost for work during the fiscal year ending June 30, 1917	35, 848. 66
Plant purchased, supplies not consumed, and outstanding liabilities	22, 236. 04

3760 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1917.

Summary—Continued.

Total expenditures and liabilities June 30, 1917:

Expenditures-----	\$44,684.70
Liabilities-----	13,400.00
	<u>\$58,084.70</u>

APPROPRIATIONS.

June 25, 1910-----	\$10,000	July 1, 1916-----	\$50,000
Aug. 24, 1912-----	50,000	June 12, 1917-----	50,000
June 23, 1913-----	75,000		
Aug. 1, 1914-----	85,000	Total -----	370,000
Mar. 8, 1915-----	50,000		

L A W S

AFFECTING THE CORPS OF ENGINEERS, UNITED STATES ARMY.

SIXTY-FOURTH CONGRESS, SECOND SESSION.

CHAP. 4.—An Act Granting to the Saint Louis, Iron Mountain and Southern Railway Company, and to the Anheuser-Busch Brewing Association, and to the Manufacturers' Railway Company permission to transfer certain rights of easement for railway purposes heretofore granted by the United States to the Saint Louis and Iron Mountain Railroad Company and to the Anheuser-Busch Brewing Association, respectively.

December 21,
1916.
[H. R. 9856.]
[Public. no.
287.]

Whereas the United States of America, heretofore by Act of Congress, approved February fourteenth, eighteen hundred and fifty-three, granted to the Saint Louis and Iron Mountain Railroad Company a right of way, sixty feet wide, over and across land owned or reserved for use by the United States in the city of Saint Louis, State of Missouri, being the land constituting the United States Arsenal Grounds, on which the Saint Louis Arsenal was located, which said right of way is being used by the Saint Louis, Iron Mountain and Southern Railway Company as lawful successor to and of said Saint Louis and Iron Mountain Railroad Company for and in maintaining and operating thereon various railroad tracks, with one of which tracks it serves the United States Engineer's depot located on that part of said Saint Louis Arsenal property, which lies east of said right-of-way strip; and

Saint Louis,
Mo., Arsenal.
Preamble.
Vol. 10, p.
754.

Whereas the United States of America, heretofore by joint resolution of Congress, approved April twenty-eighth, nineteen hundred and four, authorized the Secretary of War to, and he did thereupon, by grant dated August third, nineteen hundred and four, grant or allow to the Anheuser-Busch Brewing Association a right of way for railroad purposes forty feet in width, over and across said United States Arsenal Grounds in the city of Saint Louis, Missouri, said right of way lying west of and abutting the said right of way above referred to as that granted to the Saint Louis and Iron Mountain Railroad Company, upon which forty-foot strip there have been built certain railroad tracks now operated by the Manufacturers' Railway Company under lease or permit from said Anheuser-Busch Brewing Association; and

Vol. 33, p.
302.

Whereas said Anheuser-Busch Brewing Association not engaged in the railroad business, but is served a shipper and receiver of freight by said Manufacturers' Railway Company, which is a railroad corporation organized under the laws of the State of Missouri and engaged as a common carrier in the transportation of freight moving in interstate commerce, on behalf of many others of the shipping public in the city of Saint Louis, as well as on behalf of said brewing association and

Whereas said Anheuser-Busch Brewing Association, Saint Louis, Iron Mountain and Southern Railway Company, and Manufacturers' Railway Company, for the purpose of improving the track and traffic facilities used by each of said railways in its service of the public, have mutually agreed to sell and exchange certain strips of land or rights of way now used by said railways for railroad purposes, and to that end now desire the consent of the United States of America to the transfer of certain portions of each of said rights of way heretofore granted by the United States, as above recited: Now therefore

Be it enacted by the Senate and House of Representatives of the United States of America in Congress

Anheuser-Busch Brewing Association may transfer right of way to Manufacturers' Railway Company.
Vol. 33, p. 592.

assembled. That permission is hereby granted to the Anheuser-Busch Brewing Association to transfer by sale or lease to the Manufacturers' Railway Company, its successors or assigns, all of the said title, rights, and easement heretofore granted or permitted to said Anheuser-Busch Brewing Association, by or pursuant to said joint resolution of Congress approved April twenty-eight, nineteen hundred and four, and by grant of the Secretary of War, dated August third, nineteen hundred and four, pursuant to said joint resolution.

Manufacturers' Railway Company may exchange right of way with Saint Louis, Iron Mountain and Southern Railway Company.

SEC. 2. That permission is hereby granted to said Manufacturers' Railway Company, its successors or assigns thereupon to transfer to the Saint Louis, Iron Mountain and Southern Railway Company, its successors or assigns, that part of the said title, rights, and easements to be acquired by said Manufacturers' Railway Company under the last preceding paragraph hereof, which part relates to or affects the eastern eleven and one-half feet of the said forty-foot right-of-way strip, thereby joining said eleven and one-half feet to the said right of way of said Saint Louis, Iron Mountain and Southern Railway Company.

Saint Louis, Iron Mountain and Southern Railway Company may exchange right of way with Manufacturers' Railway Company.

SEC. 3. That permission is hereby granted to said Saint Louis, Iron Mountain and Southern Railway Company, its successors or assigns, to transfer to the Manufacturers' Railway Company, its successors or assigns, that part of the said title, rights, and easement granted by said Congress approved February fourteenth, eighteen hundred and fifty-three, which part relates to or affects the eastern portion of the said sixty-foot right-of-way

strip, said eastern portion being a tract varying in width from a minimum of fifteen feet to a maximum of sixteen feet one and one-half inches, thereby enabling said Manufacturers' Railway Company to operate over said tract a railroad track as a part of its facilities.

SEC. 4. That the respective permits hereby granted by the above sections two and three shall not be availed of unless or until the written agreement hereinafter prescribed shall have been entered into by the Manufacturers' Railway Company, to the end that the freight service heretofore rendered to said United States Engineers' depot, from said track located upon said tract or eastern portion of said sixty-foot right-of-way strip, may and shall hereafter be rendered from a switch track to be constructed by said Manufacturers' Railway Company, at its expense, into said United States Engineers' yard, for the exclusive service of the United States, namely: Said Manufacturers' Railway Company shall enter into a written agreement with or for the benefit of the United States, in such form as shall be approved by the Secretary of War, obligating the Manufacturers' Railway Company, within such reasonable time as the Secretary of War may approve, to construct at its own cost and expense, and for the exclusive ownership and service of the United States, a switch track into or through said United States Engineers' depot property, along such line therein as shall be approved by the Secretary of War; also to build and maintain thereafter a track or tracks connecting with said switch track and extending from the said Engineers' depot property, to reasonably accessible points of connection with the tracks of, and for the free use of, the Saint Louis, Iron Mountain and Southern Railway Company and of the Manufacturers' Railway Company; also to erect at its own expense, on the south side of said United States Engineers' depot grounds, such reasonable gate or gates as shall be approved by the Secretary of War, if the latter shall request the construction of such gates, and to pay and protect the United States against all other expenses caused by the removal and rebuilding of the paint and oil house used by the United States and now located at or near Utah Street; all of said work to be done in a manner which shall be approved by the Secretary of War.

Conditions of exchange.

Switches, tracks, etc., required.

Subject to approval by Secretary of War.

Approved, December 21, 1916.

CHAP. 7.—An Act Extending the time for completion of the bridge across the Delaware River, authorized by an Act entitled "An Act to authorize the Pennsylvania Railroad Company and the Pennsylvania and Newark Railroad Company, or their successors, to construct, maintain, and operate a bridge across the Delaware River," approved the twenty-fourth day of August, nineteen hundred and twelve.

December 27, 1916.
[S. 7005.]

[Public No. 280.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled

Delaware River. *bled*, That the time for the completion of the bridge no
 Time extend- in course of construction across the Delaware River
 ed for bridging, which the Pennsylvania Railroad Company and t
 by Pennsylva- nia Railroad Pennsylvania and Newark Railroad Company, or the
 nia Railroad Company, etc., successors, were authorized to construct, maintain, and
 at Trenton, N. J., operate by an Act entitled "An Act to authorize t
 Vol. 37, p. 402. Pennsylvania Railroad Company and the Pennsylvan
 Vol. 38, p. 807, amended. and Newark Railroad Company, or their successors,
 construct, maintain, and operate a bridge across t
 Delaware River," approved the twenty-fourth day
 August, nineteen hundred and twelve. be, and the same
 hereby, extended for a period of three years from t
 twenty-fourth day of August, nineteen hundred and si
 teen: *Provided*, That in all other respects said bridg
 shall be completed and shall be maintained and operat
 in accordance with the provisions of the Act entitl
 "An Act to regulate the construction of bridges over navi
 gable waters," approved March twenty-third, ninete
 hundred and six.

Proviso.
 Construction,
 etc.
 Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal th
 Act is hereby expressly reserved.

Approved, December 27, 1916.

January 10,
 1917.
 [S. J. Res.
 186.]

CHAP. 18.—Joint Resolution Authorizing the Secretary of W
 to issue temporary permits for additional diversions of wa
 from the Niagara River.

[Pub. Res.,
 No. 45.]
 Niagara River.
 Additional
 diversion of
 water permit-
 ted from, above
 the Falls.

*Resolved by the Senate and House of Representatives
 of the United States of America in Congress assembled.*
 That the Secretary of War be, and he is hereby, autho
 ized to issue permits, revocable at will, for the diversi
 of water in the United States from the Niagara Riv
 above the Falls for the creation of power to individua
 companies, or corporations which are now actually p
 ducing power from the waters of said river, in addition
 quantities which, with present diversions, shall in no c
 exceed the capacity of the generating machinery of t
 permittee and tenant companies now installed and rea
 for operation, nor an amount sufficient to enable the p
 mittee to supply the now existing hydroelectric deman
 of the individuals, companies, or corporations wh
 said permittee and tenant companies are now supp
 ing, but not in excess of the capacity of power-using a
 pliances of said consumers now installed and ready
 operation: *Provided*, That in no event shall the to
 quantity of water diverted in the United States from s
 river above the Falls for power purposes exceed in
 aggregate a daily diversion at the rate of twenty th
 sand cubic feet per second: *And provided further*, Th
 this resolution shall remain in force until the first day
 July, nineteen hundred and seventeen, and no longer.
 the expiration of which time all permits granted he
 under shall terminate, unless sooner revoked; and no

Provisos.
 Maximum.

Expiration of
 permits.

Rights re-
 stricted.

ing herein contained shall be held to confirm, establish, or confer in or upon any such permittee any right in or to the water which he is now diverting or which he may be authorized to divert hereunder. Any such permittee who without further authority of Congress diverts after the time herein named for the expiration of such permit any part of the additional amount of water, authorized by Congress to be diverted for the first time under this resolution, shall be guilty of a misdemeanor and be punished by a fine not exceeding \$2,000 nor less than \$500, or by imprisonment not exceeding one year nor less than thirty days, on both in the discretion of the court; and each and every day on which such violation occurs or is committed shall be deemed a separate offense: *Provided*, That where such violation is charged against the company or corporate body, the offense shall be taken and deemed to be that of any director, officer, agent, or employee of such company or corporate body ordering, directing, or permitting the same.

Punishment
for use after
termination.

Corporations
liable for acts
of agents, etc.

Approved, January 19, 1917.

CHAP. 22.—An Act Authorizing the Western New York and Pennsylvania Railway Company to reconstruct, maintain, and operate a bridge across the Allegheny River, in the borough of Warren and township of Pleasant, Warren County, Pennsylvania.

January 27,
1917.
[S. 7536.]

[Public No.
205.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Western New York and Pennsylvania Railway Company, a railroad corporation organized and existing under the laws of the States of New York and Pennsylvania, be, and it is hereby, authorized to reconstruct, maintain, and operate a bridge and approaches thereto across the Allegheny River on the location of the existing structure and suitable to the interests of navigation, partly in the borough of Warren and partly in the township of Pleasant, county of Warren, and State of Pennsylvania, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Allegheny
River.
Western New
York and Penn-
sylvania Rail-
way Company
may recon-
struct bridge
across, Warren
County, Pa.
Location.

Construction.
Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, January 27, 1917.

CHAP. 23.—An Act Authorizing the Western New York and Pennsylvania Railway Company to reconstruct, maintain, and operate a bridge across the Allegheny River, in Glade and Kinzua Townships, Warren County, Pennsylvania.

January 27,
1917.
[S. 7538.]

[Public No.
296.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress as-

Allegheny River. *sembled, That the Western New York and Pennsylvania Railway Company, a railroad corporation organized and existing under the laws of the States of New York and Pennsylvania, be, and it is hereby, authorized to reconstruct, maintain, and operate a bridge and approach thereto across the Allegheny River, on the location of the existing structure and suitable to the interests of navigation, in Glade and Kinzua Townships, county of Warren and State of Pennsylvania, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.*

Location. *SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.*

Construction. Vol. 34, p. 84.

Amendment. *Approved, January 27, 1917.*

January 30, 1917. **CHAP. 24.**—An Act Authorizing the Delaware Railroad Company to construct, maintain, and operate a bridge across Nanticoke River at Seaford, Sussex County, Delaware.

[S. 7359.]

[Public No. 297.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Delaware Railroad Company, a railroad corporation organized and existing under laws of the State of Delaware, be, and it is hereby, authorized to construct, maintain, and operate a bridge and approach thereto across the Nanticoke River, at a point suitable to the interests of navigation, at Seaford, county of Sussex and State of Delaware, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Nanticoke River. *SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.*

Delaware Railroad Company bridge, Seaford, Del.

Construction.

Vol. 34, p. 84.

Amendment. *Approved, January 30, 1917.*

January 30, 1917. **CHAP. 25.**—An Act To authorize the United New Jersey Railroad and Canal Company, and such other corporation or individuals as may be associated with it, to construct a bridge across the portion of the Delaware River between the mainland of the county of Camden and State of New Jersey, and Petty Island said county and State.

[S. 7748.]

[Public No. 298.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the United New Jersey Railroad and Canal Company, a corporation created and organized under laws of the State of New Jersey, and such other corporation or individuals, if any, as shall be associated with said company for the purpose, their successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a bridge and approach thereto across the Delaware River, on the location of the existing structure and suitable to the interests of navigation, in Camden County, State of New Jersey, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Delaware River.

United New Jersey Railroad and Canal Company bridge, Petty Island, N. J.

tain, and operate a bridge and approaches thereto across the intervening portion of the Delaware River, at a point suitable to the interests of navigation, from the mainland of Camden County, in the State of New Jersey, to Petty Island, in said county and State, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six, and that said bridge may be either for railroad purposes alone, or in part for railroad and in part for highway purposes, at the option of said United New Jersey Railroad and Canal Company.

Construction.
Vol. 34, p. 84.

Sec. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, January 30, 1917.

CHAP. 30.—An Act Authorizing the Western New York and Pennsylvania Railway Company to reconstruct, maintain, and operate a bridge across the Allegheny River, in the town of Allegany, county of Cattaraugus, New York.

February 6,
1917.
[S. 7537.]

[Public No.
302.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Western New York and Pennsylvania Railway Company, a railroad corporation organized and existing under the laws of the States of New York and Pennsylvania, be, and it is hereby, authorized to reconstruct, maintain, and operate a bridge and approaches thereto across the Allegheny River, on the location of the existing structure and suitable to the interests of navigation, in the town of Allegany, county of Cattaraugus and State of New York, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Allegheny
River.
Western New
York and Penn-
sylvania Rail-
way Company
may recon-
struct bridge
across, Alle-
gany, N. Y.

Construction.
Vol. 34, p. 84.

Sec. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, February 6, 1917.

CHAP. 31.—An Act Granting the consent of Congress to Washington-Newport News Short Line, a corporation, to construct a bridge across the Potomac River.

February 6,
1917.
[S. 8090.]

[Public No.
303.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to the Washington-Newport News Short Line, a corporation chartered under the laws of the State of Virginia, with principal place of business in the city of Newport News, State of Virginia, and its successors and assigns, to construct, maintain, and operate a bridge and ap-

Potomac
River.
Washington-
Newport News
Short Line may
bridge, River-
side, Md.

proaches thereto across the Potomac River at a point suitable to the interests of navigation, at or near Rivers in the county of Charles, in the State of Maryland, in accordance with the provisions of the Act entitled "Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Amendment. SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 6, 1917.

February 6, 1917.
[S. J. Res. 203.]
[Pub. Res. No. 48.]

CHAP. 32.—Joint Resolution To provide for the maintenance of public order and the protection of life and property in connection with the presidential inaugural ceremonies in nineteen hundred and seventeen.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled
That \$23,000, or so much thereof as may be necessary, payable from any money in the Treasury not otherwise appropriated and from the revenues of the District of Columbia in equal parts, is hereby appropriated to enable the Commissioners of the District of Columbia to maintain public order and protect life and property in said District from the twenty-eighth of February to the tenth of March, nineteen hundred and seventeen, both inclusive, including the employment of personal services, payment of allowances, traveling expenses, hire of means of transportation, and other incidental expenses in discretion of the commissioners. Said commissioners hereby authorized and directed to make all reasonable regulations necessary to secure such preservation of public order and protection of life and property and fix fares by public conveyance, and to make special regulations respecting the standing, movements, and operation of vehicles of whatever character or kind during said period and fixing fares to be charged for the use of same. Such regulations shall be in force one week prior to said inauguration, during said inauguration, and one week subsequent thereto, and shall be published in or more of the daily newspapers published in the District of Columbia; and in such other manner as the commissioners may deem best to acquaint the public with same; and no penalty prescribed for the violation of such regulations shall be enforced until five days after such publication. Any person violating any of such regulations shall be liable for each such offense to a fine not to exceed \$100 in the police court of said District, and in default of payment thereof to imprisonment in the workhouse of said District for not longer than sixty days. And the sum of \$2,000, or so much thereof as may be necessary, is hereby likewise appropriated, to be expended by the Commissioners of the District of Columbia for

District of Columbia.
Appropriation for maintenance of order, etc., inaugural ceremonies.
Regulations, etc., authorized.

Duration, etc.

Penalty for violations.
Public convenience, stations, etc.

construction, rent, maintenance, and expenses incident to the operation of temporary public-comfort stations, first-aid stations, and information booths during the period aforesaid, including the employment of personal services.

Approved, February 6, 1917.

CHAP. 49.—Joint Resolution Authorizing the granting of permits to the committee on Inaugural ceremonies on the occasion of the inauguration of the President elect in March, nineteen hundred and seventeen, and so forth.

February 9,
1917.
[H. J. Res.
358.]

[Pub. Res.,
No. 49.]

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled,

That the Secretary of War is hereby authorized to grant permits, under such restrictions as he may deem necessary, to the committee on inaugural ceremonies for the use of any reservations or other public spaces in the city of Washington under his control on the occasion of the inauguration of the President elect in March, nineteen hundred and seventeen: *Provided*, That in his opinion no serious or permanent injuries will be thereby inflicted upon such reservations or public spaces or statuary thereon; and the Commissioners of the District of Columbia may designate for such and other purposes on the occasion aforesaid such streets, avenues, and sidewalks in said city of Washington under their control as they may deem proper and necessary: *Provided, however*, That all stands or platforms that may be erected on the public spaces aforesaid, including such as may be erected in connection with the display of fireworks, shall be under the supervision of the said inaugural committee and in accordance with the plans and designs to be approved by the Engineer Commissioner of the District of Columbia, the officer in charge of public buildings and grounds, and the Superintendent of the United States Capitol Building and Grounds: *And provided further*, That the reservations or public spaces occupied by the stands or other structures shall be promptly restored to their condition before such occupation and that the inaugural committee shall indemnify the War Department for any damage of any kind whatsoever upon such reservations or spaces by reason of such use.

District of
Columbia.
Inauguration
of President.
Use of reser-
vations, etc.,
authorized.

Provides.
Conditions.

Streets, ave-
nues, etc.

Supervision of
stands, etc.

Restoration,
etc.

SEC. 2. That the Commissioners of the District of Columbia are hereby authorized to permit the committee on illumination of the inaugural committee for said inaugural ceremonies, to stretch suitable overhead conductors, with sufficient supports wherever necessary and in the nearest practicable connection with the present supply of light, for the purpose of effecting the said illumination: *Provided*, That if it shall be necessary to erect wires for illuminating or other purposes over any park or reservation in the District of Columbia, the work of erection and removal of said wires shall be under the

Use of over-
head wires for
illumination.

Provides.
Supervision of
work.

Time limit.	supervision of the official in charge of said park or reservation: <i>Provided further</i> , That the said conductors shall not be used for the conveying of electrical currents after March eighth, nineteen hundred and seventeen, and shall, with their supports, be fully and entirely removed from the streets and avenues of the said city of Washington on or before March fifteenth, nineteen hundred and seventeen: <i>And provided further</i> , That the stretching and removing of the said wires shall be under the supervision of the Commissioners of the District of Columbia who shall see that the provisions of this resolution are enforced, that all needful precautions are taken for the protection of the public, and that the pavement of any street, avenue, or alley disturbed is replaced in as good condition as before entering upon the work herein authorized: <i>And provided further</i> , That no expense or damage on account of or due to the stretching, operation or removing of the said temporary overhead conductors shall be incurred by the United States or the District of Columbia.
Safety precautions, etc.	
No public expense.	
Loan of flags, etc., for decorating.	SEC. 3. That the Secretary of War and the Secretary of the Navy be, and they are hereby, authorized to loan to the committee on inaugural ceremonies such ensigns, flags, and so forth, belonging to the Government of the United States (except battle flags) that are not now in use and may be suitable and proper for decoration, and may, in their judgment, be spared without detriment to the public service, such flags to be used in connection with said ceremonies by said committee, under such regulations and restrictions as may be prescribed by the said Secretaries, or either of them, in decorating the fronts of public buildings and other places on the line of march between the Capitol and the Executive Mansion and the interior of the reception hall: <i>Provided</i> , That the loan of the said ensigns, flags, signal numbers, and so forth, shall not take place prior to the twentieth day of February, and they shall be returned on or before the tenth day of March, nineteen hundred and seventeen: <i>Provided further</i> , That the said committee shall indemnify the said departments, or either of them, for any loss or damage to such flags not necessarily incident to such use. That the Secretary of War is hereby authorized to loan to the inaugural committee for the purpose of caring for the sick, injured, and infirm on the occasion of the inauguration of the President of the United States, such hospital tents and camp appliances and other necessary hospital furniture and utensils of all descriptions, ambulances, horses, drivers, stretchers, and Red Cross flags and poles belonging to the Government of the United States as in his judgment may be spared and are not in use by the Government at the time of the inauguration: <i>And provided further</i> , That the inaugural committee shall indemnify the War Department for any loss
Provisions.	
Time limit.	
Indemnity for damages.	
Loan of medical appliances, etc.	
Indemnity for damages.	

damage to such hospital tents and appliances, as aforesaid, not necessarily incident to such use: *And provided further*, That the said inaugural committee shall give bond, with security satisfactory to the Secretary of War, to do the same.

SEC. 4. That the Commissioners of the District of Columbia be, and they are hereby, authorized to permit the Western Union Telegraph Company and the Postal Telegraph Company to extend overhead wires to such points along the line of parade as shall be deemed by the chief marshal convenient for use in connection with the parade and other inaugural purposes, the said wires to be taken down within ten days after the conclusion of the ceremonies.

SEC. 5. That the Superintendent of the United States Capitol Building and Grounds is hereby authorized to permit the inaugural committee to use, for the temporary quartering of troops participating in said inauguration, so much of the United States courthouse, in Judiciary Square, in the city of Washington, as in his judgment is available for such use: *Provided*, That the inaugural committee shall indemnify the United States for any damage of any kind whatsoever to said courthouse by reason of such use.

Approved, February 9, 1917.

CHAP. 54.—An Act Making appropriations for fortifications and other works of defense, for the armament thereof, for the procurement of heavy ordnance for trial and service, and for other purposes.

February 14,
1917.
[H. R. 20453.]
[Public No.
300.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, to be immediately available and to continue available until expended, namely:

FORTIFICATIONS AND OTHER WORKS OF DEFENSE.

ENGINEER DEPARTMENT.

For construction of gun and mortar batteries, \$2,500,000.

The Secretary of War is authorized to transfer to the owners of the adjacent land, in partial consideration for the transfer to the United States of an easement in other land of said owners, the title of the United States to a right of way now owned by the United States and located between the tract of land known as the main Fort H. G. Wright Military Reservation and the tract of land known as the Mount Prospect Tract, on Fishers Island, Long Island Sound, New York.

Modernizing emplacements.	For modernizing older emplacements, \$102,000.
Fire-control stations.	For construction of fire-control stations and accessories, including purchase of lands and rights of way, purchase and installation of necessary lines and material of electrical communication, including telephones, cables, and other telegraphs, wiring and all special instrument apparatus, and materials, coast signal apparatus, and salaries of electrical experts, engineers, and other necessary employees connected with the use of coast artillery.
Range finders.	purchase, manufacture, and test of range finders and other instruments for fire control at the fortifications, and the machinery necessary for their manufacture at arsenals, \$608,796.
Coast Artillery war instruction.	For maintenance of Coast Artillery war-instruction matériel at Coast Artillery posts, including necessary material and labor therefor and for extra-duty pay of soldiers necessarily employed for periods not less than ten days, \$750.
Electric plants.	For installation and replacement of electric-light power plants at seacoast fortifications, \$110,000.
Searchlights.	For purchase and installation of searchlights for seacoast defenses, \$250,000.
Preservation, etc.	For protection, preservation, and repair of fortifications for which there may be no special appropriation available, and of structures for the torpedo defense of United States and for maintaining channels for access to torpedo wharves, \$250,000.
Plans.	For preparation of plans for fortifications and other works of defense, \$25,000.
Supplies, etc., electric plants.	For maintenance and repair of searchlights and electric light and power equipment for seacoast fortifications and for tools, electrical and other supplies, and appliances to be used in their operation, including the purchase of reserve lights, \$40,000.
Torpedo structures, etc.	For construction of mining casemates, cable galleries, torpedo storehouses, cable tanks, and other structures necessary for the operation, preservation, and care of submarine mines and their accessories, and for providing channels for access to torpedo wharves, \$150,000.
Sites, etc.	For procurement or reclamation of land, or rights pertaining thereto, needed for site, location, construction, or prosecution of works for fortifications and coast defenses, \$100,000.
Sea walls, etc.	For construction of sea walls and embankments, \$93,000.
Roads, water systems, etc.	For the construction of roads, trails, water and sewerage systems, and so forth, for the service of seacoast fortifications, \$40,000.
Motor passenger vehicles.	For purchase, maintenance, repair, and operation of motor-propelled passenger-carrying vehicles, expenditures are authorized to an amount not exceeding \$2,000,000 during the fiscal year nineteen hundred and eighteen from funds available from appropriations for fortifications in the continental United States.

* * * * *

FORTIFICATIONS IN INSULAR POSSESSIONS. Insular possessions.

ENGINEER DEPARTMENT.

Engineer Department.

For construction of seacoast batteries in the Hawaiian Islands, \$720,000. Seacoast batteries, Hawaiian Islands.

For protection, preservation, and repair of fortifications, including structures erected for torpedo defense, for which there may be no special appropriation available, and for maintaining channels for access to torpedo wharves, at the following localities: Preservation, repair, etc.

In the Hawaiian Islands, \$7,500;

In the Philippine Islands, \$15,000;

In all, \$22,500. Hawaiian Islands, Philippine Islands.

For surveys to locate strategic roads in connection with land defenses in the Hawaiian Islands, \$10,000. Road locations, Hawaiian Islands.

For maintenance and repair of searchlights and electric light and power equipment for seacoast fortifications and for tools, electrical and other supplies, and appliances to be used in their operation at the following localities: Electric plants.

In the Hawaiian Islands, \$2,500;

In the Philippine Islands, \$5,000;

In all, \$7,500. Hawaiian Islands, Philippine Islands.

For construction of sea walls and embankments, Hawaiian Islands, \$10,500. Seawalls, Hawaiian Islands.

For maintenance, repair, and operation of one automobile, expenditures are authorized to an amount not exceeding \$900 during the fiscal year nineteen hundred and eighteen, from funds available from appropriations for fortifications in the Hawaiian Islands. Automobile, Hawaiian Islands.

* * * * *

BOARD OF ORDNANCE AND FORTIFICATION. Board of Ordnance and Fortification.

For all needful and proper purchases, experiments, and tests to ascertain, with a view to their utilization by the Government, the most effective guns, small arms, cartridges, projectiles, fuses, explosives, torpedoes, armor plates, and other implements and engines of war, and to purchase or cause to be manufactured, under authority of the Secretary of War, such guns, carriages, armor plates, and other war material as may, in the judgment of the board, be necessary in the proper discharge of the duty devolved upon it by the Act approved September Purchases, tests, etc.

twenty-second, eighteen hundred and eighty-eight; salary of the civilian member of the board and for his necessary traveling expenses when traveling on duty as provided by the Act of February twenty-fourth, eighteen hundred and ninety-one; necessary expenses of the board, including rent of offices in the District of Columbia, at not exceeding \$900 per annum, and a per diem allowance to each officer detailed to serve thereon, when employed on duty away from his permanent station, of \$2.50; test Vol. 25, p. 489. Civilian member. Vol. 23, p. 769.

Per diem, etc. Per diem, etc.

Tests, etc. Tests, etc.

Proviso.
Right to use
invention.

of experimental guns, carriages, and other devices procured in accordance with the recommendation of the board, \$150,000, the expenditure of which shall be made by the several bureaus of the War Department heretofore having jurisdiction of the same, or by the board itself, as the Secretary of War may direct: *Provided*, That before any money shall be expended in the construction or test of any gun, gun carriage, ammunition, or implements under the supervision of the said board, the board shall be satisfied, after due inquiry, that the Government of the United States has a lawful right to the inventions involved in the construction of such gun, gun carriage, ammunition, or implements, or that the construction or test is made at the request of a person either having such lawful right or authorized to convey the same to the Government.

Material to be
of American
manufacture.

SEC. 2. That all material purchased under the provisions of this Act shall be of American manufacture, except in cases when, in the judgment of the Secretary of War, it is to the manifest interest of the United States to make purchases in limited quantities abroad, which material shall be admitted free of duty.

Ordnance
Office.
Rent of space
for draftsmen.

SEC. 3. That not to exceed \$15,000 of the funds appropriated by this Act for the armament of fortification may be expended for the rental of suitable space in Washington, District of Columbia, or for the alteration or repair of any available building owned by the Government, for the use of the drafting force of the office of the Chief of Ordnance engaged in the design of material appropriated for in this and other Acts: *Provided*, That the Chief of Ordnance is authorized, in his discretion, to enter into a contract for the lease of such suitable space for a period not to exceed five years, at an annual rent not to exceed \$15,000.

Proviso.
Five-year
lease.

Price for powder
limited.

SEC. 4. That appropriations in this Act shall not be expended for powder other than small-arms powder at a price in excess of 53 cents a pound.

Limit on price
for purchases.

SEC. 5. That except as expressly otherwise authorized herein no part of the sums appropriated by this Act shall be expended in the purchase from private manufacturers of any material at a price in excess of twenty-five per centum more than the cost of manufacturing such material by the Government, or, where such material is made or has not been manufactured by the Government, at a price in excess of twenty-five per centum more than the estimated cost of manufacture by the Government: *Provided*, That whenever in the opinion of the President the situation is such as to justify such action he may waive the limitations contained in this section.

Proviso.
Waived
in
emergencies.

Operations of
arsenals not to
be restricted.

SEC. 6. That expenditures for carrying out the provisions of this Act shall not be made in such manner as to prevent the operation of the Government arsenals at the most economical rate of production, except when a spe-

cial exigency requires the operation of a portion of an arsenal's equipment at a different rate: *Provided*, That no part of the appropriations made in this Act shall be available for the salary or pay of any officer, manager, superintendent, foreman, or other person having charge of the work of any employee of the United States Government while making or causing to be made with a stop watch or other time-measuring device a time study of any job of any such employee between the starting and completion thereof, or of the movements of any such employee while engaged upon such work; nor shall any part of the appropriations made in this Act be available to pay any premium or bonus or cash reward to any employee in addition to his regular wages, except for suggestions resulting in improvements or economy in the operation of any Government plant.

proviso.
No pay to officers using time-measuring device on work of employees.

Cash rewards, etc., restricted.

Approved, February 14, 1917.

CHAP. 69.—An Act Granting to the city and county of San Francisco, State of California, a right of way for a storm-water relief sewer through a portion of the Presidio of San Francisco Military Reservation.

February 15,
1917.
[S. 7713.]

[Public, No.
320.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of the United States is hereby given to the city and county of San Francisco, California, to locate, construct, and maintain a forty-inch concrete storm-water relief sewer over and across Lobos Creek and thence through a portion of the Presidio of San Francisco Military Reservation to a point where it will again reach Lobos Creek and discharge therein, upon such location and plans as the Secretary of War may approve and under such conditions and regulations as he may prescribe.

Presidio of
San Francisco,
Cal.
Right of way
through, grant-
ed for sewer.

SEC. 2. That the right to amend, alter, or repeal this Act is hereby expressly reserved.

Amendment.

Approved. February 15, 1917.

CHAP. 72.—An Act To authorize the construction, maintenance, and operation of a wagon bridge across the Saint Francis River at a point one-half mile northwest of Parkin, Cross County, Arkansas.

February 15,
1917.
[S. 6956.]

[Public, No.
323.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That improvement district Numbered One of Cross County, Arkansas, be, and it is hereby, authorized to construct, maintain, and operate a bridge and approaches thereto across the Saint Francis River at a point one-half mile northwest of Parkin, Cross County, Arkansas, and at a point suitable to the interests of navigation, in accordance with the provisions of the Act en-

Saint Francis
River.
Cross Coun-
ty, Ark., may
bridge, near
Parkin.

Construction, Vol. 34, p. 84. titled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third nineteen hundred and six.

Amendment. SEC. 2. That the right to alter, amend, or repeal the Act is hereby expressly reserved.

Approved, February 15, 1917.

February 15, 1917.
[S. 7367.]

[Public, No. 324.]

CHAP. 73.—An Act To authorize the construction and maintenance of a bridge across the Saint Francis River at or near the intersection of sections thirteen, fourteen, twenty-three, and twenty-four, township fifteen north, range six east, in Craighead County, Arkansas.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

bled, That the county of Craighead, a corporation organized and existing under the laws of the State of Arkansas, its successors and assigns, be, and they

Location. approaches thereto across the Saint Francis River at near the intersection of sections thirteen, fourteen, twenty-three, and twenty-four, township fifteen north, range six east, in Craighead County, Arkansas, at

Construction. point suitable to the interest of navigation, in accordance
Vol. 34, p. with the provisions of the Act entitled "An Act to re-
84. late the construction of bridges over navigable water
approved March twenty-third, nineteen hundred and

Amendment. SEC. 2. That the right to alter, amend, or repeal the
Act is hereby expressly reserved.

Approved, February 15, 1917.

February 15,
1917.
[S. 75-56.]
[Public. No.
825.]

CHAP. 74.—An Act To grant to the Mahoning and Shenandoah Railway and Light Company, its successors and assigns, the right to construct, complete, maintain, and operate a combination railroad, canal, and bridge, and approaches thereto, across the Mahoning River, near the borough of Lowellville, in the County of Mahoning, State of Ohio.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress

Mahoning River. *Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the consent of Congress is hereby granted to the Mahoning and Shenango Railway and Light Company may dam and bridge, Mahoning County, Ohio, complete, maintain, and operate a combined dam and bridge.

Vol. 34, p. 386; Vol. 36, p. 603.

Vol. 34, p. 84. twenty-third, nineteen hundred and ten, and the
entitled "An Act to regulate the construction of brick

over navigable waters," approved March twenty-third, nineteen hundred and six.

SEC. 2. That the parts thereof constructed prior to June fourteenth, nineteen hundred and sixteen, are hereby legalized subject to the provisions of this Act. Prior construction legalized.

SEC. 3. That in addition to the provisions of the above-mentioned Acts respecting alterations or removal of the structure herein authorized the right is hereby reserved to require its alteration or removal, at the expense of the persons owning, controlling, or operating the structure, in the event that the United States improve the Mahoning River for navigation or participate in the improvement thereof, and in the event that interests other than the United States improve the river for navigation the right is reserved to require alteration or removal of that portion of the structure built subsequent to June fourteenth, nineteen hundred and sixteen, the expense thereof to be a matter for adjustment between the persons owning, controlling, or operating the structure and those making the improvement. Right reserved to alter or remove.

SEC. 4. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, February 15, 1917.

CHAP. 75.—An Act Authorizing the County of Beltrami, Minnesota, to construct a bridge across the Mississippi River in said county. February 15, 1917.
[S. 7024.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the county of Beltrami, in the State of Minnesota, be, and it is hereby, authorized to construct, maintain, and operate a highway bridge and approaches thereto across the Mississippi River, at a point suitable to the interests of navigation, in section twenty-two, township one hundred and forty-six north, range thirty west, fifth principal meridian, in the State of Minnesota, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six. [Public No. 326.]

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Mississippi River.
Beltrami County, Minn., may bridge.
Location.
Construction.
Vol. 34, p. 84.
Amendment.

Approved, February 15, 1917.

CHAP. 91.—An Act Granting the consent of Congress to the village of Fox Lake, in the county of Lake, State of Illinois, to construct a bridge across both arms of the Fox River where it connects Pistakee Lake and Nippersink Lake, at a point suitable to the interests of navigation, in the county of Lake, State of Illinois. February 19, 1917.
[H. R. 14074.]
[Public No. 331.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted Fox River.

Fox Lake, village may bridge, Lake County, Ill.

Construction.
Vol. 34, p. 84.

Former Act repealed.
Vol. 38, p. 765.

Amendment.

to the village of Fox Lake, in the county of Lake, State of Illinois, and its successors and assigns, to construct, maintain, and operate a bridge and approaches thereacross both arms of the Fox River where it connects Pistakee Lake and Nippersink Lake, at a point suitable to the interests of navigation, in the county of Lake, in the State of Illinois, in accordance with the provisions of an Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

SEC. 2. That the Act approved October twenty-second, nineteen hundred and fourteen, entitled "An Act to authorize Frank H. Gardiner to construct a bridge across the waters of Pistakee Lake and Nippersink Lake and near the point of intersection," is hereby repealed.

SEC. 3. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 19, 1917.

February 19, 1917.
[H. R. 17602.]
[Public, No. 332.]

Red River of the North.
Polk County, Minn., and Grand Forks County, N. Dak., may bridge.

Location.

Construction.
Vol. 34, p. 84.

Amendment.

CHAP. 92.—An Act Granting the consent of Congress to the county commissioners of Polk County, Minnesota, and Grand Forks County, North Dakota, to construct a bridge across the River of the North on the boundary line between said States.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to the county commissioners of Polk County, Minnesota, and Grand Forks County, North Dakota, and their successors and assigns, to construct, maintain, and operate a bridge and approaches thereto across the Red River of the North at a point suitable to the interests of navigation, at or near where the town line between section thirty township one hundred and forty-nine and section thirty-three, township one hundred and fifty north, range forty-nine west, fifth principal meridian, runs into the river, and on the boundary line between said States in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-three, nineteen hundred and six.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 19, 1917.

February 19, 1917.
[H. R. 18550.]
[Public, No. 333.]

Cumberland River.

CHAP. 93.—An Act Granting the consent of Congress to the county of Montgomery, in the State of Tennessee, to construct a bridge across the Cumberland River.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted

to the county of Montgomery, in the State of Tennessee, and its successors and assigns, to construct, maintain, and operate a bridge and approaches thereto across the Cumberland River at a point suitable to the interests of navigation at a point seven or eight miles from the city of Clarksville, in the county of Montgomery, in the State of Tennessee, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Montgomery
County, Tenn.,
may bridge.

Location.

Construction.
Vol. 34, p.
84.

Sec. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, February 19, 1917.

CHAP. 94.—An Act Granting the consent of Congress to the county of Montgomery, in the State of Tennessee, to construct a bridge across the Cumberland River.

February 19,
1917.
[H. R. 18551.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to the county of Montgomery, in the State of Tennessee, and its successors and assigns, to construct, maintain, and operate a bridge and approaches thereto across the Cumberland River at a point suitable to the interests of navigation, at or near the city of Clarksville, in the county of Montgomery, in the State of Tennessee, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

[Public No.
334.]

Cumberland
River.
Montgomery
County, Tenn.,
may bridge,
Clarksville.

Construction.
Vol. 34, p. 84.

Sec. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, February 19, 1917.

CHAP. 95.—An Act Granting the consent of Congress to Kratka Township, Pennington County, Minnesota, to construct a bridge across Red Lake River.

February 19,
1917.
[H. R. 18725.]

[Public No.
835.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to Kratka Township, Pennington County, Minnesota, and their successors and assigns, to construct, maintain, and operate a bridge and approaches thereto across the Red Lake River at a point suitable to the interests of navigation at or near the section line between sections twenty and twenty-one, township one hundred and fifty-three north, range forty-one west of the fifth principal meridian, in the county of Pennington, in the State of Minnesota, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges

Red Lake
River.
Kratka Town-
ship, Minn.,
may bridge.

Construction.
Vol. 34, p. 84.

over navigable waters," approved March twenty-third, nineteen hundred and six.

Amendment. SEC. 2. That the right to alter, amend, or repeal the Act is hereby expressly reserved.

Approved, February 19, 1917.

February 10, 1917. CHAP. 98.—An Act Granting the consent of Congress to county commissioners of Decatur County, Georgia, to reconstruct a bridge across the Flint River at Bainbridge, Georgia.
[H. R. 20574.]

[Public No. 336.]

Flint River.
Decatur
County, Ga.
may reconstruct bridge
across, at Bainbridge.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to the county commissioners of Decatur County, Georgia, and their successors and assigns, to reconstruct, maintain and operate a bridge and approaches thereto across Flint River, at a point suitable to the interests of navigation, at or near Bainbridge, Georgia, on the location of the existing structure, in the county of Decatur, in the State of Georgia, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Construction.
Vol. 34, p. 84.

Amendment. SEC. 2. That the right to alter, amend, or repeal the Act is hereby expressly reserved.

Approved, February 19, 1917.

February 20, 1917. CHAP. 99.—An Act To donate to the city of Saint Augustine, Florida, for park purposes, the tract of land known as the powder-house lot.
[S. 3699.]

[Public No. 338.]

Saint Augustine, Fla.
Powder-house
lot donated to.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the tract of land situate in the city of Saint Augustine, Florida, known as the powder-house lot, heretofore set aside as a military reservation of the United States, and lately abandoned as such military reservation, be, and same is hereby, donated to the municipality of said city of Saint Augustine, in the State of Florida, to be used by said municipality for public park purposes.

Conveyance
for public park.

SEC. 2. That the Secretary of the Interior is hereby directed to execute and deliver to the duly constituted authorities of the said city of Saint Augustine, Florida, such conveyances as may be necessary to vest the simple title to said powder-house lot in the said city of Saint Augustine, Florida, attaching to such conveyance the condition that whenever the said powder-house lot shall cease to be used by the city for public park purposes or whenever the Secretary of War may determine that the use of said grounds is necessary for Government purposes, then and in that event title to the said powder-house lot shall revert to the Government of the United States.

Reversion on
nonuser, etc.

Approved, February 20, 1917.

CHAP. 100.—An Act To construct a bridge in San Juan County, State of New Mexico. February 20, 1917.
[S. 5424.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of the Interior is hereby authorized and directed to cause to be constructed a steel bridge across the San Juan River in San Juan County, State of New Mexico, at the best and most available location west or southwest and near to the town of Farmington, in said county and at a cost to the Government of the United States not to exceed \$25,000, which sum, or so much thereof as may be necessary, is hereby appropriated, out of any money in the Treasury not otherwise appropriated, to defray the expense and cost of constructing said bridge: *Provided,* That said sum is to be reimbursable from any funds now or hereafter placed in the Treasury to the credit of the Navajo Indians of the State of New Mexico.

[Public No. 339.]

San Juan River.
Appropriation for bridging, in San Juan County, N. Mex.

Proviso.
Repayment from funds of Navajo Indians.

Approved, February 20, 1917.

CHAP. 108.—An Act Granting the consent of Congress to the Conway County Bridge District to construct, maintain, and operate a bridge across the Arkansas River, in the State of Arkansas. February 21, 1917.
[S. 8105.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to the Conway County Bridge District, a corporation organized under the laws of the State of Arkansas, and its successors and assigns, to construct, maintain, and operate a bridge and approaches thereto across the Arkansas River at a point suitable to the interests of navigation at or between fractional southwest section twenty-nine, township six north, range sixteen west, of the fifth principal meridian, and fractional northeast section thirty-one, township six north, range sixteen west, of the fifth principal meridian, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

[Public No. 342.]

Arkansas River.

Conway County, Ark., may bridge.

Location.

Construction.
Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, February 21, 1917.

CHAP. 110.—An Act Authorizing the construction of a bridge across the Tallapoosa River, separating the counties of Montgomery and Elmore, in the State of Alabama, at a point somewhere between Judkin Ferry and Hughes Ferry. February 21, 1917.
[H. R. 17710.]

[Public No. 344.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress as-

Tallapoosa River. *sembled, That the counties of Montgomery and Elmore in the State of Alabama, be, and are hereby, authorized to construct, maintain, and operate a bridge and approaches thereto across the Tallapoosa River, separating the counties of Montgomery and Elmore, in the State of Alabama, at a point suitable to the interests of navigation, at a point somewhere between Judkin Ferry and Hughes Ferry, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.*

Location.

Construction.
Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal the Act is hereby expressly reserved.

Approved, February 21, 1917.

February 21,
1917.
[H. R. 18529.]

[Public, No.
345.]

Red River.
Rapides Parish.
may bridge.
Boyce, La.

Construction.
Vol. 34, p. 84.

Amendment.

CHAP. 111.—An Act Granting the consent of Congress to the police jury of Rapides Parish, Louisiana, to construct a bridge across Red River at or near Boyce, Louisiana.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to the police jury of Rapides Parish, Louisiana, and their successors and assigns, to construct, maintain, and operate a bridge and approaches thereto across the Red River at a point suitable to the interests of navigation at or near Boyce, Louisiana, in the parish of Rapides, in the State of Louisiana, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

SEC. 2. That the right to alter, amend, or repeal the Act is hereby expressly reserved.

Approved, February 21, 1917.

February 23,
1917.
[S. 6850.]

[Public, No.
349.]

Army.
Officers re-
tired for Pan-
ama Canal
service may be
restored to ac-
tive list.
Vol. 38, p.
1191.

CHAP. 116.—An Act Authorizing transfer of certain retired Army officers to the active list.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That hereafter the President be, and he is hereby, authorized, within one year of the approval of the Act, by and with the advice and consent of the Senate, to transfer, upon application, to the active list of the Army any officer under fifty years of age who may have been transferred heretofore from the active to the retired list of the Army under the Act to provide for recognizing the services of certain officers of the Army, Navy, and Public Health Service for their services in connection with the construction of the Panama Canal, and for other purposes, approved March fourth, nineteen hundred and

teen: *Provided*, That such officers shall take rank at the foot of the respective grades which they held at the time of their retirement and shall be carried as an additional number in the grade to which he may be transferred or at any time thereafter promoted, and shall be promoted on the same date as the officer next above him in rank, and shall be commissioned in the arm or department of the Army from which he was retired: *Provided further*, That such officer shall stand a satisfactory medical examination, and when promoted shall stand the medical and professional examinations provided for by law: *And provided further*, That any officer transferred to the active list under this Act shall not again be entitled to the benefits of the Panama Canal Act described above, except when retired for age or for physical disability incurred in the line of duty.

Provides.
Rank as additional number in former grade.

Examinations.

Further retirement, etc., limit.

Approved, February 23, 1917.

CHAP. 119.—An Act To declare Ollala Slough in Lincoln County, Oregon, non-navigable.

February 26, 1917.
[S. 1697.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That all of that portion of Ollala Slough in Lincoln County, Oregon, above a point where a line that is one hundred and twenty rods south and running east and west and parallel with the section line between sections eight and seventeen in township eleven south, range ten west of the Willamette meridian, crosses said stream, be, and is hereby, declared to be a nonnavigable stream.

[Public, No. 351.]

Ollala Slough, Ore.

Declared a nonnavigable stream.

Approved, February 26, 1917.

CHAP. 126.—Joint Resolution Giving authority to the Commissioners of the District of Columbia to make special regulations for the occasion of the reunion of the Confederate Veterans' Association, to be held in the District of Columbia in the year nineteen hundred and seventeen, and for other purposes incident to said encampment.

February 26, 1917.
[S. J. Res. 157.]
[Pub. Res. No. 50.]

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the Commissioners of the District of Columbia are hereby authorized and directed to make such special regulations for the occasion of the reunion of the Confederate Veterans' Association, which will take place in the District of Columbia in the year nineteen hundred and seventeen, as they shall deem advisable for the preservation of public order and the protection of life and property, to be in force one week prior to said encampment, during said encampment, and one week subsequent thereto. Such special regulations shall be published in one or more of the daily newspapers of the District of

District of Columbia. Confederate Veterans' Reunion in. Commissioners to make special regulations for.

Publication.

Columbia, and no penalty prescribed for the violation of such regulations shall be enforced until five days after such publication; and said commissioners are authorized and directed to establish a special schedule of fares applicable to public conveyances in said District during the period aforesaid. Any persons violating any of the aforesaid regulations or the aforesaid schedule of fares shall, upon conviction thereof in the police court of the said District, be liable for such offense to a fine not exceed \$100, and in default of payment of such fine imprisonment in the workhouse or jail of said District for not longer than sixty days. This resolution shall take effect immediately upon its approval, and the sum of \$11,000, or so much thereof as may be necessary, payable from any money in the Treasury not otherwise appropriated and from the revenues of the District of Columbia in equal parts, is hereby appropriated to enable the Commissioners of the District of Columbia to carry out the provisions of section one of this joint resolution. \$1,000 of which shall be available for the construction, maintenance, and operation of public-comfort stations and information booths, under the direction of said commissioners.

Schedules of cab fares, etc. **Penalty for violations.** **Appropriation for expenses. Half from District revenues.** **Public comfort stations, etc.** **Illumination permits.** **Proviso. Limit of use.** **Placing and removing wires.** **Nonliability for damages.** **Wires over parks and reservations.**

SEC. 2. That the Commissioners of the District of Columbia are hereby authorized to permit the commission on illumination of the citizens' executive committee for the entertainment of the Confederate Veterans' Association to stretch suitable conductors, with sufficient supports wherever necessary, for the purpose of effecting the said illumination within the District of Columbia: *Provided*, That the said conductors shall not be used for the conveying of electrical currents more than three days after the close of said reunion, and shall, with their supports, be fully and entirely removed from the streets and avenues of the said city of Washington on or before ten days after said reunion: *Provided further*, That the stretching and removing of the said wires shall be under the supervision of the Commissioners of the District of Columbia, who shall see that the provisions of this resolution are enforced; that all needful precautions are taken for the protection of the public; and that the pavement of any street, avenue, or alley disturbed is replaced in as good condition as before entering upon the work herein authorized: *Provided further*, That no expense damage on account of or due to the stretching, operation or removing of the said temporary overhead conductors shall be incurred by the United States or the District of Columbia: *And provided further*, That if it shall be necessary to erect wires for illumination purposes over any park or reservation in the District of Columbia then the work of erection and removal of said wires shall be under the supervision of the official in charge of said park or reservation.

SEC. 3. That the Secretary of War and the Secretary of the Navy be, and they are hereby, authorized to loan <sup>Loan of Gov-
ernment flags,
etc.</sup> to the chairman of the subcommittee in charge of street decorations, or his successor in said office, for the purpose of decorating the streets of the city of Washington, District of Columbia, on the occasion of the reunion of the Confederate Veterans' Association, nineteen hundred and seventeen, such of the United States ensigns, flags (except battle flags), signal numbers, and so forth, belonging to the Government of the United States as in their judgment may be spared and are not in use by the Government at the time of the reunion. The loan of the said ensigns, flags, signal numbers, and so forth, to said chairman shall not take place more than ten days prior to said reunion and shall be returned by him within ten days from the close of the reunion.

SEC. 4. That for the protection and return of said ensigns, flags, signal numbers, and so forth, the said chairman, or his successor in office, shall execute and deliver to the President of the United States, or to such officer as he may designate, a satisfactory bond in the penalty of \$50,000 to secure just payment for any loss or damage to said ensigns, flags, and signal numbers not necessarily incident to the use specified. <sup>Bond re-
quired.</sup>

SEC. 5. That the Secretary of War is hereby authorized to grant permits to the citizens' executive committee for the entertainment of the Confederate veterans' reunion for the use of any reservation or other public spaces in the city of Washington on the occasion of said reunion which, in his opinion, will inflict no serious or permanent injuries upon such reservations or public spaces or statutory therein; and the Commissioners of the District of Columbia may designate for such and other purposes on the occasion aforesaid such streets, avenues, and sidewalks in said city of Washington as they may deem proper and necessary: *Provided, however,* That all stands and platforms that may be erected on the public spaces aforesaid shall be under the supervision of the said citizens' executive committee and in accordance with plans and designs to be approved by the Superintendent of the Capitol, the Commissioner of Public Buildings and Grounds, and the building inspector of the District of Columbia. <sup>Use of res-
ervations, etc.,
for stands.</sup>

SEC. 6. That the Secretary of War is hereby authorized to loan to the chairman of the medical department of the citizens' executive committee for said reunion, or his successor in said office, for the purpose of caring for the sick, injured, and infirm on the occasion of the said reunion, such hospital tents and camp appliances and other necessities, hospital furniture, and utensils of all descriptions, ambulances, horses, drivers, stretchers, and Red Cross flags and poles belonging to the Government of the United States as in his judgment may be spared and are not in use by the Government at the time of the encamp- <sup>Loan of hos-
pital tents, etc.</sup>

Proviso.
Indemnity.

ment: *Provided*, That the said chairman, or his successor in said office, shall indemnify the War Department for any loss to such hospital tents and appliances as aforesaid said not necessarily incident to such use.

Approved, February 26, 1917.

February 26,
1917.
[S. J. Res. 205.]

[Pub. Res.,
No. 51.]

CHAP. 127.—Joint Resolution Authorizing the removal of the statue of Admiral Dupont in Dupont Circle in the city of Washington, District of Columbia, and the erection of a memorial to Admiral Dupont in place thereof.

District of
Columbia.
Memorial to
Admiral Du-
pont may be
erected in place
of statue.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled,

Provisos.
Disposal of
present statue.

Approval by
Commission of
Fine Arts, etc.

Area limited.

Time for erec-
tion.

and the Chief of Engineers, United States Army, be and he is hereby, authorized and directed to grant permission for the removal of the statue and pedestal and foundations of Admiral Dupont in Dupont Circle in the city of Washington, District of Columbia, and the erection in place thereof within the circle of a memorial to said Admiral Dupont: *Provided*, That the present statue and pedestal may, after the completion of the memorial in place thereof, be turned over to the donors of the memorial for relocation outside the District of Columbia: *Provided further*, That the site and design of the memorial shall be approved by the Commission of Fine Arts and that the United States shall be put to no expense or by the removal of the statue, pedestal and foundations and the erection of said memorial, complete: *Provided further*, That no greater area in the said Dupont Circle shall be taken for the memorial herein authorized than the small circle now occupied by the statue of Admiral Dupont: *Provided further*, That if the erection of this memorial shall not be begun within three years from and after the passage of this joint resolution, the permission granted may, in the discretion of the Chief of Engineers, United States Army, be revoked at any time.

Approved, February 26, 1917.

February 27,
1917.
[H. R. 18534.]

[Public, No.
363.]

CHAP. 138.—An Act To authorize the construction, maintenance, and operation of a bridge across the Saint Francis River at or near Parkin, Arkansas.

Saint Fran-
cis River.
O. N. Kill-
lough may
bridge, Parkin,
Ark.

Construction.
Vol. 34, p. 84.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That O. N. Killough, and his successors and assigns, be, and he is hereby, authorized to construct, maintain, and operate a bridge and approaches thereon across the Saint Francis River at or near the town of Parkin, in Cross County, Arkansas, at a point suitable to the interests of navigation, in accordance with the provisions of the Act entitled "An Act to regulate the co-

struction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, February 27, 1917.

CHAP. 139.—An Act Permitting the building of a railroad February 27,
across the Mississippi River at Bemidji, in the State of [H. R. 18720.]
Minnesota.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to the Mississippi River, Minneapolis, Red Lake and Manitoba Railway Company, a railway corporation organized under the laws of the State of Minnesota, to construct, maintain, and operate a bridge and approaches thereto across the Mississippi River, at a point suitable to the interests of navigation, from a point on the east bank of said river in lot two of section sixteen, township one hundred and forty-six, range forty-three west, to a point on the west bank of said river in lot one of said section sixteen, all in Beltrami County, Minnesota, in accordance with the provisions of an Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, February 27, 1917.

CHAP. 141.—An Act Granting the consent of Congress to the February 27,
County of Pearl River, Mississippi, and the fourth ward of the [H. R. 19239.]
Parish of Washington, Louisiana, to construct a bridge across Pearl River, between Pearl River County, Mississippi, and Washington Parish, Louisiana. [Public. No. 366.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby granted to the Pearl River, Pearl River County, Miss., and Washington Parish, La., their successors and assigns, to construct, maintain, operate a bridge and approaches thereto across the Pearl River at a point suitable to the interests of navigation, at or near the fourth ward of the parish of Washington, State of Louisiana, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, February 27, 1917.

March 1, 1917. **CHAP. 144.**—An Act To provide for the control of the floods
 [H. R. 14777.] the Mississippi River and of the Sacramento River, California
 [Public, No. and for other purposes.
 307.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That for controlling the floods of the Mississippi River and continuing its improvement from the Head of the Passes to the mouth of the Ohio River the Secretary of War is hereby empowered, authorized, and directed to carry on continuously, by hired labor or otherwise, the plans of the Mississippi River Commission heretofore hereafter adopted, to be paid for as appropriations made from time to time be made by law, not to exceed in the aggregate \$45,000,000: *Provided*, That not more than \$10,000,000 shall be expended therefor during any one fiscal year.

(a) All money appropriated under authority of this section shall be expended under the direction of the Secretary of War in accordance with the plans, specifications, and recommendations of the Mississippi River Commission as approved by the Chief of Engineers, for controlling the floods and for the general improvement of the Mississippi River, and for surveys, including the survey from the Head of the Passes to the headwaters of the river, and a survey of the Atchafalaya Outlet so far as may be necessary to determine the cost of protecting its basin from the flood waters of the Mississippi River either by its divorcement from the Mississippi River or by other means, and for salaries, clerical, office, traveling, and miscellaneous expenses of the Mississippi River Commission.

(b) That no money appropriated under authority of this section shall be expended in the construction or repair of any levee unless and until assurances have been given satisfactory to the commission that local interests protected thereby will contribute for such construction and repair a sum which the commission shall determine to be just and equitable but which shall not be less than one-half of such sum as may have been allotted by the commission for such work: *Provided*, That such contributions shall be expended under the direction of the commission, or in such manner as it may require or approve but no contribution made by any State or levee district shall be expended in any other State or levee district except with the approval of the authorities of the State or district so contributing.

(c) Any funds which may hereafter be appropriated under authority of this Act for improving the Mississippi River between the Head of the Passes and the mouth of the Ohio River, and which may be allotted to levees, may be expended upon any part of said river between the Head of the Passes and Rock Island, Illinois.

d) No money appropriated under authority of this Act shall be expended in payment for any right of way for any levee which may be constructed in cooperation with any State or levee district under authority of this Act, but all such rights of way shall be provided free of cost to the United States: *Provided*, That no money and no expense incurred by any State or levee district in securing such rights of way, or in any temporary works of emergency during an impending flood, or for the maintenance of any levee line, shall be computed as a part of the contribution of such State or levee district toward the construction or repair of any levee within the meaning of paragraph (b) of this section.

That the watercourses connected with the Mississippi River to such extent as may be necessary to exclude the flood waters from the upper limits of any delta basin, together with the Ohio River from its mouth to the mouth of the Cache River, may, in the discretion of said commission, receive allotments for improvements now under way or hereafter to be undertaken.

Upon the completion of any levee constructed for flood control under authority of this Act, said levee shall be turned over to the levee district protected thereby for maintenance thereafter; but for all other purposes the United States shall retain such control over the same as it may have the right to exercise upon such completion.

Rights of way to be provided free of cost.

Proviso.
Moneys for, not included in contributions to construction, etc.

Allotments to connecting watercourses.

Maintenance of completed levees by local interests.

SACRAMENTO RIVER, CALIFORNIA.

S a c r a m e n t o
R i v e r, C a l.

SEC. 2. That for controlling the floods, removing the debris, and continuing the improvement of the Sacramento River, California, in accordance with the plans of the California Débris Commission, the Secretary of War is hereby authorized and directed to carry on continuously, by hired labor or otherwise, the plan of said commission contained in its report submitted August 10, 1910, and printed in House Document Numbered Eighty-one, Sixty-second Congress, first session, as modified by the report of said commission submitted February eighth, nineteen hundred and thirteen, approved by the Chief of Engineers of the United States Army and the Board of Engineers for Rivers and Harbors, and printed in Rivers and Harbors Committee Document Numbered Five, Sixty-third Congress, first session, in so far as said plan provides for the rectification and enlargement of river channels and the construction of weirs, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate \$5,600,000: *Provided*, That not more than \$1,000,000 shall be expended therefor during any one fiscal year.

(a) All money appropriated under authority of this Act shall be expended under the direction of the Secretary of War, in accordance with the plans, specifications, and estimates of the Chief of Engineers, approved by the Board of Engineers for Rivers and Harbors, and printed in Rivers and Harbors Committee Document Numbered Five, Sixty-third Congress, first session, in so far as said plan provides for the rectification and enlargement of river channels and the construction of weirs, to be paid for as appropriations may from time to time be made by law, not to exceed in the aggregate \$5,600,000: *Provided*, That not more than \$1,000,000 shall be expended therefor during any one fiscal year.

Plan adopted for flood control, etc.

Limit of cost.
Proviso.

Annual expenditures.
Scope of improvements, etc.

	tions, and recommendations of the California Débris Commission, as approved by the Chief of Engineers, the control of floods, removal of débris, and the general improvement of the Sacramento River: <i>Provided</i> , That no money shall be expended under authority of this section until assurances have been given satisfactory to the Secretary of War (a) that the State of California will contribute annually for such work a sum equal to such sum as may be expended annually therefor by the United States under authority of this section; (b) that such equal contributions by the State of California will continue annually until the full equal share of the cost of such work shall have been contributed by said State; and (c) that the river levees contemplated in the report of the California Débris Commission, dated August ten, nineteen hundred and ten, will be constructed to such grade and section and within such time as may be required by said commission: <i>Provided further</i> , That the State shall not be required to expend for such work, in any one year, a sum larger than that expended therefor by the United States during the same year: <i>And provided further</i> , That the total contributions so required of the State of California shall not exceed in the aggregate \$5,600,000.
<i>Proviso.</i> Assurance of annual contribution by State.	
Continuance, etc.	
Levee construction.	
State expenditures limited.	
Total amount.	
Expenditure of State contribution.	(b) All money contributed by the State of California as herein provided, shall be expended under the direct authority of the California Débris Commission and in such manner as it may require or approve, and no money appropriated under authority of this section shall be expended in the purchase of or payment for any right of way, easement or land acquired for the purposes of this improvement, but all such rights of way, easements, and lands shall be provided free of cost to the United States: <i>Provided</i> , That no money paid or expense incurred therefor shall be computed as a part of the contribution of the State of California toward the work of improvement herein provided for within the meaning of paragraph (a) of this section.
Free rights of way.	
<i>Proviso.</i> Not included in improvement work.	
Maintenance by State when completed.	(c) Upon the completion of all works for flood control herein authorized the said works shall be turned over to the State of California for maintenance thereafter; for all other purposes the United States shall retain such control over the same as it may have the right to exercise upon such completion.

General provisions.

GENERAL PROVISIONS.

Laws applicable.

Disbursements.

SEC. 3. That all the provisions of existing law relating to examinations and surveys and to works of improvement of rivers and harbors shall apply, so far as applicable to examinations and surveys and to works of improvement relating to flood control. And all expenditures

is hereafter appropriated for works and projects relating to flood control shall be made in accordance with subject to the law governing the disbursement and expenditure of funds appropriated for the improvement of rivers and harbors.

All examinations and surveys of projects relating to flood control shall include a comprehensive study of the watershed or watersheds, and the report thereon in addition to any other matter upon which a report is required shall give such data as it may be practicable to secure with regard to (a) the extent and character of the area to be affected by the proposed improvement; (b) the probable effect upon any navigable water or waterway; (c) the possible economical development and utilization of water power; and (d) such other uses as may be properly related to or coordinated with the project. And the heads of the several departments of the Government shall, in their discretion, and shall upon the request of the Secretary of War, detail representatives from their respective departments to assist the Engineers of the Army in the study and examination of such watersheds, to the end that duplication of work may be avoided and the various services of the Government economically coordinated therein: *Provided*, That all reports on preliminary examinations hereafter authorized, together with the report of the Board of Engineers for Rivers and Harbors thereon and the separate report of the representative of any other department, shall be submitted to the Secretary of War by the Chief of Engineers, with his recommendations, and shall be transmitted by the Secretary of War to the House of Representatives, and are hereby ordered to be printed when so made.

At the consideration of all works and projects relating to flood control which may be submitted to the Board of Engineers for Rivers and Harbors for consideration and recommendation, said board shall, in addition to any other matters upon which it may be required to report, give its opinion as to (a) what Federal interest, if any, is involved in the proposed improvement; (b) what part of the expense, if any, should be borne by the United States; and (c) the advisability of adopting the project.

All examinations and reports which may now be made by the Board of Engineers for Rivers and Harbors upon request of the Committee on Rivers and Harbors relating to works or projects of navigation shall in like manner be made upon request of the Committee on Flood Control. All works and projects relating to flood control.

SEC. 4. That the salary of the civilian members of the Mississippi River Commission shall hereafter be \$5,000 per annum.

Approved, March 1, 1917.

Flood-control surveys.

Scope of reports.

Area affected.
Navigation.
Water-power utilization.

Assistance of other departments, etc.

Proviso.
Printing, etc., reports.

Board of Engineers for Rivers and Harbors to report on projects

Examinations on request of Flood Control Committee.

March 2, 1917.
[H. R. 18453.]
[Public. No.
369.]

CHAP. 146.—An Act Making appropriations for the current and contingent expenses of the Bureau of Indian Affairs, for fulfilling treaty stipulations with various Indian tribes, and for other purposes, for the fiscal year ending June thirtieth, nineteen hundred and eighteen.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums be, and they are hereby, appropriated, out of any money in the Treasury otherwise appropriated, for the purpose of paying current and contingent expenses of the Bureau of Indian Affairs, for fulfilling treaty stipulations with various Indian tribes, and in full compensation for all offices and salaries which are provided for herein for the service of the fiscal year ending June thirtieth, nineteen hundred and eighteen, namely:

Indian Department appropriations.
Arizona and New Mexico.

ARIZONA AND NEW MEXICO.

Gila River. Dam, etc., to divert water for irrigating lands, etc.

For completing the construction by the Indian Service of a dam with a bridge superstructure and the necessary controlling works for diverting water from the Colorado River for the irrigation of Indian land and Indian allotments on the Gila River Indian Reservation, Arizona, recommended by the Board of Engineers of the United States Army in paragraph two hundred and seventy of its report to the Secretary of War of February fourteenth, nineteen hundred and fourteen (House Document Numbered Seven hundred and ninety-one), \$125,000, to be immediately available and to remain available until expended, reimbursable as provided in section two of the Act of August twenty-fourth, nineteen hundred and twelve (Thirty-seventh Statutes at Large, page five hundred and twenty-two), the total cost not to exceed \$200,000.

Repayment.
Vol. 37, p.
522.

Gila River. Diversion dam for irrigating lands in Pinal County.

For completing the construction by the Indian Service of a diversion dam and necessary controlling works for diverting water from the Gila River at a site above Florence, Arizona, \$100,000, to remain available until expended, the total cost not to exceed \$175,000, and for beginning the construction of the necessary canal structures to carry the natural flow of the Gila River through the Indian lands of the Gila River Indian Reservation and to public and private lands in Pinal County, as provided in the Indian appropriation Act approved March eighteenth, nineteen hundred and sixteen, \$75,000, to remain available until expended; in all, \$175,000.

Bridges, Little Colorado and Canyon Diablo Rivers.

For the construction of two bridges over the Little Colorado and Canyon Diablo Rivers, near the Leona Indian Agency, Arizona, \$42,500, to be expended until

direction of the Secretary of the Interior. reimburs- Repayment from Indian funds.
 to the United States from any funds now or here-
 placed in the Treasury to the credit of the Navajo
 ans in Arizona, to remain a charge and lien upon the
 s and funds of said tribe of Indians until paid.

* * * * *

MINNESOTA.

Minnesota.

* * * * *

the Secretary of the Interior is hereby authorized to Cass Lake Reservation.
 \$5,000 of the tribal funds of the Chippewa Indians
 e State of Minnesota and pay the same to the proper
 orities toward the construction of a bridge across the Bridging Mississippi River in, from tribal funds.
 ississippi River on the Cass Lake Reservation upon
 ondition that Congress shall hereafter appropriate
 00 to be contributed to the Forestry Service for the
 ose aforesaid and the local authorities. State or
 y, contribute \$10,000 toward the building of said
 ge. Contributions required.

* * * * *

proved, March 2, 1917.

AP. 151.—An Act Granting the consent of Congress to the March 2, 1917.
 of Fort Atkinson, in Jefferson County, Wisconsin, for the [S. 8227.]
 uction of a bridge across the Rock River. [Public, No. 374.]

it enacted by the Senate and House of Representa-
of the United States of America in Congress as-
ed, That the consent of Congress is hereby granted
 e city of Fort Atkinson, in Jefferson County, in the
 of Wisconsin, and to its successors and assigns, to
 ruct, maintain, and operate a bridge, and approaches
 to, across the Rock River in said city at a point suit-
 to the interests of navigation and at a point where
 Street approaches said river in the county of Jeffer-
 State of Wisconsin, in accordance with the provi-
 of the Act entitled "An Act to regulate the con-
 tion of bridges over navigable waters," approved
 h twenty-third, nineteen hundred and six.

c. 2. That the right to alter, amend, or repeal this
 s expressly reserved. Construction, Vol. 34, p. 84.
 proved, March 2, 1917. Amendment.

AP. 160.—An Act Making appropriations to provide for the March 3, 1917.
 es of the government of the District of Columbia for the [H. R. 19119.]
 year ending June thirtieth, nineteen hundred and eighteen. [Public, No. 378.]
 or other purposes.

it enacted by the Senate and House of Representa-
of the United States of America in Congress as-
ed, That one half of the following sums, respec- District of Columbia ap-
 y, is appropriated, out of any money in the Treasury ropriations.

Half from District revenues, not otherwise appropriated, and the other half out of the revenues of the District of Columbia, in full for the following expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, nineteen hundred and eighteen, namely:

* * * * *

Improvements
and repairs.

IMPROVEMENTS AND REPAIRS.

* * * * *

Bridges.
Construction
and repairs.
Street
bridges over
railroads.

BRIDGES: For construction and repairs, \$25,000. This appropriation shall be available for repairing when necessary any bridge carrying a public street over the right of way or property of any railway company, and the amounts thus expended shall be collected from such railway company in the manner provided in section five of an Act providing a permanent form of government for the District of Columbia, approved June eleventh, eighteen hundred and seventy-eight, and shall be deposited in the Treasury to the credit of the United States and the District of Columbia in equal parts.

Vol. 20, p. 105.

Highway
Bridge.

Highway Bridge across Potomac River: Draw operators—two at \$1,020 each, two at \$720 each; four watchmen, at \$720 each; labor, \$1,500; lighting, power, and miscellaneous supplies, and expenses of every kind necessarily incident to the operation and maintenance of the bridge and approaches, \$8,620; in all, \$16,480.

South Dakota
Avenue NE.
Bridge across
Baltimore and
Ohio Railroad
tracks.

South Dakota Avenue Bridge: For constructing a bridge to carry vehicular and pedestrian traffic, in the line of South Dakota Avenue, over the tracks of the Washington Branch of the Baltimore and Ohio Railroad, all in accordance with plans approved by the Commissioners of the District of Columbia, \$65,000. And the said commissioners are authorized to enter into a contract with the said railroad company, or other parties, for the construction of such bridge and approaches: *Provided,*

Construction
contract.

Provided.
Share of
railroad in
cost.
Vol. 32, p. 918.

That such portion of this cost shall be borne by the Baltimore and Ohio Railroad Company as is provided in section 10 of an Act entitled "An Act to provide for a union railroad station in the District of Columbia, and for other purposes," approved February twenty-eighth, nineteen hundred and three, and said sum shall be paid by said company to the Treasurer of the United States, one half to the credit of the District of Columbia and the other half to the credit of the United States, and the same shall be a valid and subsisting lien against the franchises and property of the said Baltimore and Ohio Railroad Company, and shall be a legal indebtedness of said company in favor of the District of Columbia, jointly for its use and the use of the United States as aforesaid, and the said lien may be enforced in the name of the District of Columbia by bill in equity brought by the commissioners of the said District in the Supreme Court of said District or by any other lawful proceeding against the said

Lien for pay-
ment.

Enforcement.

Baltimore and Ohio Railroad Company: *Provided further*, That no street railway company shall use the bridge herein authorized for its tracks until such company shall have paid to the Treasurer of the United States a sum equal to one-sixth of the total cost of said bridge, one half thereof to be credited to the United States and the other half to the credit of the District of Columbia.

Operation of Anacostia River Bridge: For employees, miscellaneous supplies, and expenses of every kind necessary to operation and maintenance of the bridge. \$4,500.

* * * * *

ROCK CREEK PARK.

For care and improvement of Rock Creek Park and the Piney Branch Parkway, exclusive of building for superintendent's residence, to be expended under the direction of the board of control of said park in the manner now provided by law for other expenditures of the District of Columbia, \$22,000.

* * * * *

ANACOSTIA RIVER AND FLATS.

For continuing the reclamation and development of the Anacostia River and Flats from the Anacostia Bridge northeast to the District line, to be expended for the purposes and under the conditions specified in the item for this improvement contained in the "District of Columbia appropriation Act for the fiscal year nineteen hundred and fifteen," \$300,000.

In connection with the said reclamation and development of the river and flats, the Secretary of War is authorized to acquire, for and on behalf of the United States, by purchase or by condemnation, for highway and park purposes, the fee simple and absolute title to all lands required for said objects and not now owned by the United States, in and along the Anacostia River from the Anacostia Bridge to the center line of East Capitol Street, embraced within the area lying between the lines, one on each side of the river, following approximately the contour of ten feet elevation above the plane of mean low water at the United States navy yard; and the Secretary of War is further authorized to acquire for the United States, by purchase or by condemnation, for highway and park purposes, in connection with the said reclamation and development of the Anacostia River and Flats, the fee simple and absolute title to all lands required for said objects and not now owned by the United States, in and along the Anacostia River in the section thereof running from the center line of East Capitol Street to the northeast boundary line of the District of Columbia, embraced within the limits designated "tak-

Rock Creek Park.

Care, etc.

Anacostia River Flats.

Continuing reclamation.

Vol. 38, p. 549.

Purchase of lands authorized in connection with.

Territory included.

Use of appropriations for condemnation damages, etc.

Proviso.
Condemnation proceedings.

Vol. 34, p. 151.

Adjustment of lands, etc., with Philadelphia, Baltimore and Washington Railroad.

Release by railroad.

By United States.

Consolidation of rights of way.

Other conveyances.

ing line," one on each bank of the river in said section as indicated on the map entitled "Reclamation Anacostia River Flats, District of Columbia, land map," approved by the Chief of Engineers, United States Army, and Secretary of War, as attested and authenticated by the respective signatures and the seal of the War Department bearing date the twenty-fourth day of May, nineteen hundred and sixteen, recorded and filed in the Office of the Chief of Engineers, United States Army, under the Engineer Department file numbered 12968-525; and the appropriation herein made for the reclamation and development of the Anacostia River and Flats from the Anacostia Bridge northeast to the District line, and all appropriations heretofore made for said purpose are hereby made available for the purchase or condemnation of the said lands hereinbefore authorized to be acquired and for the payment of amounts awarded as damages on said lands and the costs and expenses of the condemnation proceedings in the event that it is necessary to institute such condemnation proceedings: *Provided*, That said lands or any part thereof can not be acquired by purchase from the owners thereof at a price satisfactory to the Secretary of War, the Commissioners of the District of Columbia, upon request of the Secretary of War shall institute condemnation proceedings to acquire said lands under the provisions of chapter fifteen of the Code of Law for the District of Columbia.

The Secretary of War is authorized to effect an adjustment of boundaries and an exchange of lands in the District of Columbia with the Philadelphia, Baltimore and Washington Railroad, in accordance with the plat drawing on file in the office of the Chief of Engineers designated E. D. 12968-531, whereby on the left bank of the Anacostia River said railroad company shall relinquish and convey to the United States the certain lands along the Anacostia River riverward of the line shown on said plat and needed for the reclamation and development of the Anacostia River and Flats, and the United States shall release and quitclaim to said railroad company any right, title, interest, or claim in or to certain lands shoreward of said line, as shown on said plat, and will permit the extension of said company's right of way to include the triangle of land two hundred and sixty and ten one-hundredths feet on the hypotenuse lying between the junction of the railroad bridge and the original shoreline of said river, as shown on said plat, and whereon the right bank of the Anacostia River, the United States shall permit the rights of way of the said railroad company for its entrance into the city of Washington to be consolidated, between the bulkhead of the railroad bridge at the Anacostia River and the south line of L Street south, into one right of way of equal top width according to the lines of said plat, and the United States and the said railroad company shall reciprocally release

claim, and convey to each other the portions of square of ten hundred and eighty, so called, and the accretions to the same lying respectively northward and southward of the division line shown on said plat, and the said railroad company shall release, quitclaim, and confirm to the United States the title to all land along and adjacent to the Anacostia River from the bulkhead of the present railroad bridge to Fifteenth Street east, exterior to the portion of square south of ten hundred and eighty to be released to said railroad company as shown on said plat, together with all appurtenances and riparian rights, privileges, and advantages and subject only to the consolidated right of way as hereinbefore stated and delineated on said plat.

and the Secretary of War is further authorized and directed on behalf of the United States to make, execute, deliver and to accept from said railroad company such deeds of conveyance or quitclaim or other assurances of title, as in the opinion of the Attorney General may be necessary or appropriate to effect such adjustment of boundaries and exchange of lands: *Provided*, That all expenses of recording such deeds and other expenses incidental to the execution of such exchanges shall be borne by the said railroad company: *Provided further*, That in the effectuation of the adjustment of boundaries and exchange of lands herein provided for, the Commissioners of the District of Columbia are authorized to release that portion of L Street south lying between Water Street and the Commodore Barney Circle, and to permit the use and occupation of the same by the Philadelphia, Baltimore and Washington Railroad Company in connection with the consolidated right of way authorized by this Act.

Transfers of title.

Provided. Expenses by railroad company.

Closing of portion of L Street.

PARKS.

Small parks.

For the condemnation of small park areas to be acquired in accordance with the provisions relating to all parks in the District of Columbia contained in the dry civil appropriation Act, approved August first, nineteen hundred and fourteen, \$25,000.

Condemnation expenses. Vol. 38, p. 625.

WATER SERVICE.

Water service.

For laying sixteen-inch trunk mains in Reservoir Street, New Cut Road to Conduit Road northwest, \$26,600. The following sums are appropriated wholly out of the revenues of the water department for expenses of the Washington Aqueduct and its appurtenances and for expenses of the water department, namely:

Trunk mains to Conduit Road.

Payments wholly from water revenues.

WASHINGTON AQUEDUCT.

Washington Aqueduct.

For operation, including salaries of all necessary employees, maintenance, and repair of Washington Aqueduct and its accessories, McMillan Park Reservoir, Wash-

Maintenance of reservoir, tunnel, filtration plant, etc.

- ington Aqueduct tunnel, the Filtration Plant, the plant for the preliminary treatment of the water supply, authorized water meters on Federal services, vehicles, and for each and every purpose connected therewith, \$130,000.
- Conduit Road.** For ordinary repairs, grading, opening ditches, and other maintenance of Conduit Road, \$5,000.
- Lining tunnels.** For continuing the lining of such portions of unlined sections of the tunnels of the Washington Aqueduct as may be necessary to prevent disintegration and falling rock, \$10,000.
- Emergency fund.** For emergency fund, to be used only in case of a serious break requiring immediate repair in one of the more important aqueduct or filtration plant structures, such as a dam, conduit, tunnel, bridge, building, or important piece of machinery, the unexpended balance of the appropriation for the fiscal year nineteen hundred and seventeen is reappropriated and made available for the fiscal year nineteen hundred and eighteen; all expenditures from this appropriation shall be reported in detail to Congress.
- Water meters in Treasury, and State, War, and Navy Buildings.** For completing purchase, installation, and maintenance of water meters, to be placed on the water services of Treasury Building and the State, War, and Navy Department Building, and for each and every purpose connected therewith, said meters to be purchased, installed, and maintained by and remain under the observation of an officer in charge of the Washington Aqueduct, \$3,600.
- McMillan Park grounds.** For continuation of parking grounds around McMillan Park Reservoir, \$3,000.
- Control of War Department continued.** Nothing herein shall be construed as affecting the superintendence and control of the Secretary of War over the Washington Aqueduct, its rights, appurtenances, and fixtures connected with the same and over appropriations and expenditures therefor as now provided by law.
- * * * * *
- Women's Titanic Memorial Association. Permitted to erect memorial on public grounds.** SEC. 7. That the Chief of Engineers, United States Army, be, and he is hereby, authorized and directed to grant permission to the Women's Titanic Memorial Association for the erection on public grounds of the United States in the city of Washington, District of Columbia, other than those of the Capitol, the Library of Congress, Potomac Park, and the White House, of a memorial appropriate as a lasting tribute to the heroes who sacrificed their lives, that women and children might be saved in the tragic catastrophe of the sinking of the steamship Titanic: *Provided*, That the site chosen and the design of the memorial shall be approved by the Joint Library Committee of Congress and the Commission of Fine Arts, and that the United States shall be put to no expense or by the erection of said memorial.
- * * * * *

Approved, March 3, 1917.

CHAP. 161.—An Act Making appropriations for the Diplomatic and Consular Service for the fiscal year ending June thirtieth, nineteen hundred and eighteen. March 3, 1917.
[H. R. 19300.]

[Public, No.
379.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums be, and they are hereby, severally appropriated, in full compensation for the Diplomatic and Consular Service for the fiscal year ending June thirtieth, nineteen hundred and eighteen, out of any money in the Treasury not otherwise appropriated, for the objects hereinafter expressed, namely:

Diplomatic
and consular
appropriations.

* * * * *

BOUNDARY LINE, ALASKA AND CANADA, AND THE UNITED STATES AND CANADA.

To enable the Secretary of State to mark the boundary and make the surveys incidental thereto between the Territory of Alaska and the Dominion of Canada, in conformity with the award of the Alaskan Boundary Tribunal and existing treaties, including employment at the seat of government of such surveyors, computers, draftsmen, and clerks as are necessary; and for the more effective demarcation and mapping, pursuant to the treaty of April eleventh, nineteen hundred and eight, between the United States and Great Britain, of the land and water boundary line between the United States and the Dominion of Canada, as established under existing treaties, to be expended under the direction of the Secretary of State, including the salaries of the commissioner and the necessary engineers, surveyors, draftsmen, computers, and clerks in the field and at the seat of government, rental of offices at Washington, District of Columbia, expense of printing and necessary traveling, for payment for timber necessarily cut in determining the boundary line not to exceed \$1,000, and commutation to members of the field force while on field duty or actual expenses not exceeding \$2.50 per day each, to be expended in accordance with regulations from time to time prescribed by the Secretary of State, \$105,000, together with the unexpended balances of previous appropriations for these objects: *Provided*, That hereafter advances of money under the appropriation "Boundary line, Alaska and Canada, and the United States and Canada," may be made to the commissioner on the part of the United States and by his authority to chiefs of parties, who shall give bond under such rules and regulations and in such sum as the Secretary of State may direct, and accounts arising under advances shall be rendered through and by the commissioner on the part of the United States to the Treasury Department as under advances heretofore made to chiefs of parties.

Boundary.
Alaska and
Canada.
Vol. 32, p.
1961.

Boundary.
United States
and Canada.
Vol. 35, p.
2003.

Provided.
Advances to
commissioner.

* * * * *

WATERWAYS TREATY, UNITED STATES AND GREAT BRITAIN
INTERNATIONAL JOINT COMMISSION, UNITED STATES AND
GREAT BRITAIN.

Canadian
Boundary Wa-
ters Commis-
sion.

Vol. 36, p.
2448.

Proviso.
Subsistence
when absent
from Washing-
ton.

Preparation of
cases.

For salaries and expenses, including salaries of commissioners and salaries of clerks and other employees appointed by the commissioners on the part of the United States, with the approval solely of the Secretary of State, including rental of offices at Washington, District of Columbia, expense of printing, and necessary traveling expenses, and for one-half of all reasonable and necessary joint expenses of the International Joint Commission incurred under the terms of the treaty between the United States and Great Britain concerning use of boundary waters between the United States and Canada, and for other purposes, signed January eleventh, nineteen hundred and nine, \$75,000, to be disbursed under the direction of the Secretary of State. *Provided*, That no part of this appropriation shall be expended for subsistence of the commission or Secretary, except \$8 per day each, when absent from Washington on official business.

For payment of services rendered and expenses incurred under the direction of the Secretary of State the examination and preparation of cases involving obstruction, diversion, and use of boundary waters and all other questions or matters of difference covered by treaty of January eleventh, nineteen hundred and nine between the United States and Great Britain, and in appearing before and representing the interests of United States involved in all matters or investigations before the International Joint Commission created by said treaty, \$6,000.

* * * * *

Approved, March 3, 1917.

March 3, 1917.
[H. R. 18542.]

[Public, No.
381.]

CHAP. 163.—An Act Making appropriations for the legislative, executive, and judicial expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and eighteen, and for other purposes.

Legislative,
executive, and
judicial ex-
penses appro-
priations.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums are appropriated, out of any money in the Treasury not otherwise appropriated, in full compensation for the service of the fiscal year ending June thirtieth, nineteen hundred and eighteen, namely:

War Depart-
ment.

WAR DEPARTMENT.

Office of Chief
of Engineers.

OFFICE OF CHIEF OF ENGINEERS: Chief clerk, \$2,200; two chiefs of divisions, at \$2,000 each; clerks—eight

ss four, twelve of class three, fifteen of class two, twenty of class one, fourteen at \$1,000 each, six at \$900 each; six messengers; three assistant messengers; laborer; messenger boy, \$400; in all, \$112,510.

The services of skilled draftsmen, civil engineers, and other services as the Secretary of War may deem necessary, may be employed only in the Office of the Chief Engineers, to carry into effect the various appropriations for rivers and harbors, fortifications, and surveys and preparation for and the consideration of river and harbor estimates and bills, to be paid from such appropriations: *Provided*, That the expenditures on this account for the fiscal year nineteen hundred and eighteen shall not exceed \$50,400; the Secretary of War shall each year, in the annual estimates, report to Congress the number of persons so employed, their duties, and the amount paid to each.

Skilled draftsmen, etc.

Proviso.
Limit, etc.

* * * * *

CONTINGENT EXPENSES. WAR DEPARTMENT: For purchase of professional and scientific books, law books, including their exchange: books of reference, blank books, pamphlets, periodicals, newspapers, maps; typewriters and adding machines; furniture and repairs to same; carpets, matting, oilcloth, file cases, towels, ice, brooms, soap, sponges, fuel, gas, and heating apparatus for and repairs to buildings (outside of the State, War, and Navy Department Building) occupied by Adjutant General's Office and other offices of the War Department and its bureaus located in the Lemon Building; purchase, exchange, care, and subsistence of horses, and the purchase, maintenance, repair, and exchange of wagons, motor trucks, and horse-drawn passenger-carrying vehicles, and mess, to be used only for official purposes; freight and express charges; street car tickets, not exceeding \$300; other absolutely necessary expenses, including a per diem allowance not to exceed \$4 in lieu of subsistence pursuant to section thirteen of the sundry civil Act approved August first, nineteen hundred and fourteen, 1900.

Contingent expenses.

Per diem subsistence,
Vol. 38, p. 680.

For stationery for the department and its bureaus and offices, \$25,000. Stationery.
For postage stamps for the department and its bureaus, required under the Postal Union, to prepay postage on matters addressed to Postal Union countries, \$250. Postage.
For rent of buildings in the District of Columbia: War Department, \$7,200; Adjutant General's Office, \$1,500; Bureau of Ordnance, \$1,800; in all, \$10,500. Rent.

PUBLIC BUILDINGS AND GROUNDS.

OFFICE OF PUBLIC BUILDINGS AND GROUNDS: Superintendent, \$3,000; assistant and chief clerk, \$2,400; clerks—of class four, one of class three, one of class two and

Public buildings and grounds.

Superintendent, assistant, clerks, etc.

stenographer, one of class one; messenger; landscape architect. \$2,400; surveyor and draftsman, \$1,500; in all, \$16,140.

Foremen, etc. For foremen, gardeners, mechanics, and laborers employed in the public grounds, \$31,200.

Watchmen. For sergeant of park watchmen, \$950.

For second sergeant of park watchmen, \$900.

Day force. For day watchmen, as follows: One in Franklin Park and adjacent reservations on New York Avenue; one in Lafayette Park; two in Smithsonian Grounds and neighboring reservations; one in Judiciary Park; one in Lincoln Park and adjacent reservations; one in Iowa Circle and reservations to the northeast; one in Thomas and Scott Circles and neighboring reservations; one in Washington Circle and neighboring reservations; one in Dupont Circle and neighboring reservations; one in McPherson Park and Farragut Square; one in Stanton Park and neighboring reservations; two in Henry and Seaton Parks and neighboring reservations; one in Mount Vernon Park and reservations to the northeast; one in grounds south of the Executive Mansion; one in Garfield and Marion Parks and reservations to the east; one in Monument Park; four in Potomac Park; and one in Montrose Park; twenty-three in all, at \$840 each, \$19,320.

Night force. For night watchmen, as follows: Three in Smithsonian Grounds and neighboring reservations; one in Judiciary Park; two in Henry and Seaton Parks and adjacent reservations; one in grounds south of the Executive Mansion; one in Monument Park; one in Garfield Park and neighboring reservations; one in Iowa, Scott, and Thomas Circles and neighboring reservations; two in Stanton and Lincoln Parks and neighboring reservations; two in Lafayette, McPherson, Franklin, and Farragut Parks; one in Washington and Dupont Circles and neighboring reservations; one in Mount Vernon Park and neighboring reservations; two for greenhouses and nursery; and four in Potomac Park; twenty-two in all, at \$840 each, \$18,480.

Wakefield, Va. For watchman for the care of the monument and dock at Wakefield, Virginia, the birthplace of Washington, \$300.

Contingent expenses. For contingent and incidental expenses, including purchase of professional and scientific books and technical periodicals, books of reference, blank books, photographs, and maps, \$700.

For purchase and repair of bicycles and revolvers for park watchmen and for purchase of ammunition, \$1,000.

For maintenance, repair, and operation of two motorcycles at \$144 each, \$288.

For purchasing and supplying uniforms to park, Monument, and bridge watchmen, \$3,000.

Of the foregoing amounts appropriated under public buildings and grounds, the sum of \$37,569 shall be paid out of the revenues of the District of Columbia. Part from District revenues.

Approved, March 3, 1917.

CHAP. 179.—An Act Making appropriations for the Department of Agriculture for the fiscal year ending June thirtieth, nineteen hundred and eighteen. March 4, 1917.
[H. R. 19359.]

[Public, No. 390.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums be, and they are hereby, appropriated, out of any money in the Treasury of the United States not otherwise appropriated, in full compensation for the fiscal year ending June thirtieth, nineteen hundred and eighteen, for the purposes and objects hereinafter expressed, namely:

Agricultural Department appropriations.

DEPARTMENT OF AGRICULTURE.

* * * * *

MISCELLANEOUS.

Miscellaneous.

* * * * *

COOPERATIVE FIRE PROTECTION OF FORESTED WATERSHEDS OF NAVIGABLE STREAMS: For cooperation with any State or group of States in the protection from fire of the forested watersheds of navigable streams under the provisions of section two of the Act of March first, nineteen hundred and eleven, entitled "An Act to enable any State to cooperate with any other State or States, or with the United States, for the protection of the watersheds of navigable streams, and to appoint a commission for the acquisition of lands for the purpose of conserving the navigability of navigable rivers," \$100,000. Conservation of navigable waters etc.
Cooperation with States for fire protection, etc.
Vol. 36, p. 961.

* * * * *

Approved, March 4, 1917.

CHAP. 186.—An Act Authorizing the commissioners of the Red River Bridge District to construct a bridge across the Red River at or near Index, Texas. March 4, 1917.
[S. 8228.]

[Public, No. 397.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the commissioners of the Red River Bridge District be, and they are hereby, authorized to construct, maintain, and operate a bridge and approaches thereto Red River. Red River Bridge district may bridge, Index, Tex.

over the Red River at or near Index, Texas, for railroad and other traffic at a point suitable to the interests of navigation, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Amendment. SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, March 4, 1917.

PRIVATE ACT.

February 15,
1917.
[S. 3748.]

CHAP. 79.—An Act To reimburse John Simpson.

[Private, No.
185.]
John Simpson.
Payment to,
for property
damages.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of the Treasury be, and he is hereby, authorized and directed to pay, out of any moneys in the Treasury not otherwise appropriated, the sum of \$100 to John Simpson, of Pulaski County, Kentucky, to reimburse him for damages arising from the destruction of a creek ford due to backwater created by the construction of Lock and Dam Numbered Twenty-one on the Cumberland River, and which payment is recommended to Congress by the Chief of Engineers, with a renewed recommendation therefor, in his annual report for the fiscal year ending June thirtieth, nineteen hundred and fifteen (pages ten hundred and eighty-five, twenty-eight hundred and thirty-seven, and twenty-eight hundred and thirty-eight), which is printed as House Document Numbered Ninety-one, Sixty-fourth Congress, first session.

Approved, February 15, 1917.

FLOATING PLANT REPORT.

INDEX TO CONTENTS.

STATEMENT OF FLOATING PLANT OWNED BY THE UNITED STATES AND EMPLOYED IN THE ENGINEER DEPARTMENT AT LARGE FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1916.

[Compiled for the calendar year ending Dec. 31, 1916, and shown in tabular form.]

Page.

I. 3807 to 3824, inc.	Alphabetical list, by names.
II. 3825 to 3846, inc.	Alphabetical list, by classes.
II. 3847 to 3979, inc.	Complete list of floating plant, by districts.
IV. 3981 to 4028, inc.	Operations of seagoing hopper dredges.
V. 4029 to 4150, inc.	Operations of hydraulic pipe-line dredges.
VI. 4151 to 4203, inc.	Operations of dipper dredges.
II. 4205 to 4234, inc.	Operations of bucket dredges.
III. 4235 to 4268, inc.	Operations of snag boats.
X. 4269 to 4315, inc.	Operations of derrick boats.
X. 4317 to 4341, inc.	Operations of pile drivers.
XI. 4343 to 4352, inc.	Operations of hydraulic graders.
II. 4353 to 4371, inc.	Operations of drill boats.
II. 4373 to 4387, inc.	Operations of maneuver boats.
IV. 4389 to 4434, inc.	Operations of tug and survey boats, screw (steam).
V. 4435 to 4438, inc.	Operations of steam lighters.
VI. 4439 to 4503, inc.	Operations of tow and survey boats, paddle (steam).
II. 4505 to 4656, inc.	Operations of gasoline launches (screw).
II. 4657 to 4665, inc.	Operations of gasoline towboats (paddle).
X. 4667 to 4671, inc.	List of dry docks.
X. 4673 to 4679, inc.	List of boat-building plants.
XI. 4681 to 4687, inc.	Floating plant under construction.
II. 4689 to 4697, inc.	Floating concrete-mixing plant.
II. 4699 to 4714, inc.	Hydraulic pipe-line dredging by contract.
IV. 4715 to 4724, inc.	Dipper dredging by contract.
V. 4725 to 4744, inc.	Bucket dredging by contract.
VI. 4745 to 4750, inc.	Drilling and blasting by contract.
II. 4751 to 4770, inc.	Coal purchased by B. T. U. method.
II. 4771 to 4786, inc.	Wrecks removed.
X. 4787 to 4822, inc.	Floating plants rented.
X. 4823 to 4824, inc.	Wireless equipment.
XI. 4825 to 4838, inc.	Floating plant constructed and placed in commission.
II. 4839 to 4852, inc.	Floating plant dropped or lost.
II. 4853 to 4854, inc.	Official numbers for Engineer Department vessels.

TABLE I.

**ALPHABETICAL LIST OF FLOATING PLANT,
BY NAMES.**

13751—ENG 1917—241

3807

TABLE I.—*Alphabetical list of floating plant, annual report of the Chief of Engineers, 1916.*

[NOTE.—See foregoing page for index to tables.]

Name, number, or letter.	Type.	District.	Table No.
A.....	Pile driver.....	Savannah.....	X
A.....	Quarter boat.....	Mobile, Ala.....	III
Absecon.....	Seagoing dredge.....	Wilmington, Del.....	IV
Absecon.....	Gasoline launch (screw).....	.....do.....	XVII
Ada.....	Tow and survey boat, paddle (steam).....	Rock Island.....	XVI
Adams, Col. M. B.....	Dipper dredge.....	Wheeling.....	XVI
Adams, H. M.....	Towboat, screw (steam).....	Portland, Oreg. (second).....	XIV
Addison.....	Dipper dredge.....	Wheeling.....	VI
Ajax.....	Bucket dredge.....	Wilmington, N. C.....	VII
Ajax.....	Dipper dredge.....	Rock Island.....	VI
Alabama.....	Bucket dredge.....	Chattanooga.....	VII
Alabama.....	Tow and survey boat, paddle (steam).....	Montgomery.....	XVI
Alabama.....	Gasoline launch (screw).....	Jacksonville.....	XVII
Alafia.....	Bucket dredge.....	Montgomery.....	VII
Albany.....	Gasoline launch (screw).....	Pittsburgh.....	XVII
Albatross.....	.....do.....	Rock Island.....	III
Alberita.....	Tow and survey boat, paddle (steam).....	.....do.....	XVI
Alert.....	.....do.....	Little Rock.....	XVI
Allen, A. D.....	.....do.....	Wheeling.....	XXI
Alto.....	Gasoline launch (screw).....	Savannah.....	XVII
Amelia.....	Scow.....	St. Paul.....	III
Amik.....	Gasoline launch (screw).....	New Orleans.....	XVII
Amite.....	.....do.....	Washington, D. C.....	XVII
Ana.....	.....do.....	Galveston.....	XVII
Anahuac.....	.....do.....	Savannah.....	XIV
Angler.....	Tug and survey boat, screw (steam).....	St. Paul.....	III
Anmiki.....	Gasoline launch (screw).....	Rock Island.....	V
Apo.....	Hydraulic pipe-line dredge.....	Milwaukee.....	VI
Appleton.....	Dipper dredge.....	Portland, Oreg. (second).....	XIV
Arago.....	Tug and survey boat, screw (steam).....	Milwaukee.....	XIV
Ariadne.....	.....do.....	Cleveland.....	XVII
Ariel.....	Gasoline launch (screw).....	Montgomery.....	XVII
Arrow.....	.....do.....	Portland, Oreg. (first).....	IX
Asotin.....	Derrick boat.....	New London.....	IV
Atlantic.....	Seagoing hopper dredge.....	Washington, D. C.....	IX
Atlas.....	Derrick boat.....	Montgomery.....	VI
Attalla.....	Dipper dredge.....	Savannah.....	V
Augusta.....	Hydraulic pipe-line dredge.....	Kansas City.....	XVI
Augustin, Lieut.....	Tow and survey boat, paddle (steam).....	St. Louis.....	XVI
Aux Vasses.....	Tug and survey boat, paddle (steam).....	Washington, D. C.....	XVII
Averill.....	Gasoline launch, screw.....	.....do.....	XVII
B.....	Quarter boat.....	Charleston.....	III
B.....	.....do.....	Mobile.....	III
Bacon, Henry C.....	Hydraulic pipe-line dredge.....	Wilmington, N. C.....	V
Baldwin, Edwin M.....	Towboat.....	Kansas City.....	XXI
Barataria.....	Bucket dredge.....	Miss. River Com. (fourth).....	VII
Barnard.....	Hydraulic dredge (self-propelling).....	Jacksonville.....	V
Bass.....	Gasoline launch (screw).....	Rock Island.....	V
Bastrop.....	.....do.....	Galveston.....	XVII
Baton Rouge.....	Quarter boat.....	New Orleans (M. R. C. 4th).....	III
Bayou Goula.....	.....do.....	.....do.....	III
Bayou Sara.....	.....do.....	.....do.....	III
Beatrice.....	Gasoline launch (screw).....	.....do.....	XVII
Beaufort.....	Quarter boat.....	Wilmington, N. C.....	III
Beaumont.....	Gasoline launch (screw).....	Dallas.....	XVII
Beauregard.....	Bucket dredge.....	New Orleans (M. R. C. 4th).....	VII
Beetle.....	Motor skiff.....	Rock Island.....	III
Bell.....	Gasoline launch (screw).....	Washington, D. C.....	XVII
Benyaurd.....	Seagoing hopper dredge.....	New Orleans.....	IV
Beguon.....	Canoe.....	St. Paul.....	III
Beta.....	Hydraulic pipe-line dredge.....	St. Louis (M. R. C.).....	V
Biloxi.....	Gasoline launch (screw).....	Mobile.....	XVII
Birch.....	.....do.....	St. Louis.....	XVII
Bittern.....	.....do.....	Rock Island.....	III
Black.....	Derrick boat.....	Wilmington, N. C.....	IX
Black Rock.....	Gasoline launch (screw).....	Buffalo.....	XVII
Black Water.....	Hydraulic pipe-line dredge.....	Montgomery.....	V
Boaz.....	Tug and survey boat, screw (steam).....	Vicksburg (M. R. C. 3d).....	XIV
Boeuf.....	Gasoline launch (screw).....	New Orleans.....	XVII
Bolivar.....	.....do.....	St. Louis (M. R. C.).....	XVII

TABLE I.—*Alphabetical list of floating plant, annual report of the Chief of Engineers, 1916—Continued.*

Name, number, or letter.	Type.	District.	Table No.
Bon Homme.....	Gasoline launch (screw).....	Kansas City.....	XVII
Bonne Femme.....	do.....	do.....	XVII
Bonneville.....	Stern-wheel towboat.....	do.....	XVI
Boone, Daniel.....	Tow and survey boat, paddle (steam).....	do.....	XVI
Brewerton.....	Tug and survey boat, screw (steam).....	Buffalo.....	XIV
Brunswick.....	Gasoline launch (screw).....	Savannah, Ga.....	XVII
Bull Calf.....	do.....	St. Paul.....	XVII
Buras.....	Bucket dredge (levee machine).....	New Orleans (M. R. C. 4th).....	VII
Burton.....	Seagoing hopper dredge.....	Cleveland.....	IV
Burton No. 22.....	Gasoline launch (screw).....	do.....	XVII
C.....	Quarter boat.....	Charleston.....	III
C.....	do.....	Kansas City.....	III
C-1.....	Derrick boat.....	Mobile.....	IX
Caddo.....	Gasoline launch (screw).....	Dallas.....	XVI
Calcasieu.....	do.....	New Orleans.....	XVII
Camden.....	Tug and survey boat, screw (steam).....	Philadelphia.....	XIV
Cape Fear.....	Seagoing hopper dredge.....	Wilmington, N. C.....	IV
Carroll.....	Gasoline launch (screw).....	Vicksburg (M. R. C. 3d).....	XVII
Carrollton.....	Dipper dredge.....	Cincinnati (2d).....	VI
Cascade.....	Bucket dredge.....	Portland, Ore. (1st).....	VII
Casey.....	do.....	Louisville.....	VII
Casey, Thomas Lincoln.....	Tug and survey boat, screw (steam).....	Buffalo.....	XIV
Castle.....	do.....	Washington, D. C.....	XIV
Caswell, Richard.....	do.....	Wilmington, N. C.....	V
Cataract.....	Hydraulic pipe-line dredge.....	Philadelphia.....	V
Catoma.....	Gasoline launch (screw).....	Montgomery.....	XVII
Caucus.....	Seagoing hopper dredge.....	do.....	IV
Cavallo.....	Gasoline launch (screw).....	Galveston.....	XVII
Cayuga.....	Stern-wheel towboat (steam).....	Cincinnati (first).....	XVI
Cerberus.....	Tug and survey boat, screw (steam).....	New York (super. of New York Harbor).....	XIV
Cello.....	Hydraulic pipe-line dredge.....	Portland, Ore. (first).....	V
Cerrito.....	Gasoline launch (screw).....	Los Angeles, Cal.....	XVII
Champock.....	Dipper dredge.....	Portland, Ore. (second).....	IV
Charleston.....	Seagoing hopper dredge.....	Mobile.....	XVI
Chalmette.....	Stern-wheel towboat.....	New Orleans.....	XVI
Chariton.....	Gasoline launch (screw).....	Kansas City, Mo.....	XVII
Chattahoochee.....	Snag boat.....	Montgomery.....	III
Chene.....	Spraying barge.....	New Orleans.....	VI
Cheraw.....	Dipper dredge.....	Charleston.....	XVI
Cherokee.....	Tow and survey boat, paddle (steam).....	Louisville.....	XVI
Chester.....	Quarter boat.....	Philadelphia.....	III
Chica.....	Gasoline launch (screw).....	Jacksonville, Fla.....	XVII
Chicago.....	do.....	Chicago, Ill.....	XVII
Chickamauga.....	Stern-wheel towboat.....	Chattanooga.....	XVI
Chickasaw.....	Tug and survey boat (screw).....	Mobile.....	XIV
Chico.....	Gasoline launch (screw).....	Cincinnati, Ohio (first).....	XVII
Chicot.....	do.....	Chattanooga.....	XVII
Chilhowee.....	Tow and survey boat (paddle).....	Vicksburg (M. R. C. 3d).....	XVI
Chinook.....	Seagoing hopper dredge.....	Portland, Ore. (second).....	IV
Chipeta.....	Tug and survey boat, screw (steam).....	Norfolk.....	XIV
Chipola.....	Gasoline launch (screw).....	Galveston.....	XVII
Chippewa.....	do.....	Rock Island.....	XVII
Chisca.....	Tow and survey boat, paddle (steam).....	Memphis (M. R. C. 1st, 2d).....	XVI
Choctaw.....	do.....	St. Louis (M. R. C.).....	XVI
Choctawatchee.....	Snag boat.....	Montgomery.....	VIII
Choupique.....	Quarter boat.....	Wilmington, N. C.....	XXXI
Cincinnati.....	Dipper dredge.....	Cincinnati, Ohio (first).....	VI
Circle.....	Tug and survey boat, screw (steam).....	Duluth.....	XIV
Clatsop.....	Seagoing hopper dredge.....	Portland, Ore. (second).....	IV
Clermont.....	Gasoline launch (screw).....	Cincinnati, Ohio (first).....	XVII
Clinch.....	do.....	Chattanooga.....	XVII
Clinton, De Witt.....	Hydraulic pipe-line dredge.....	New York (first).....	V
Clyde.....	Gasoline launch (screw).....	San Francisco (first).....	XVII
Coal Bluff.....	Tow and survey boat, paddle (steam).....	Rock Island.....	XVI
Cobra.....	Gasoline launch (screw).....	do.....	III
Cockspur.....	do.....	Savannah, Ga.....	XVII
Coinjock.....	Quarter boat.....	Norfolk.....	III
Colbert.....	Tow and survey boat, paddle (steam).....	Chattanooga.....	XVI
Colonel.....	Gasoline launch (screw).....	Galveston.....	XVII
Columbia.....	Snag boat.....	Vicksburg.....	VIII
Columbus.....	Tow and survey boat, paddle (steam).....	Montgomery.....	XVI
Comanche.....	do.....	Chicago.....	XVI
Comet.....	Gasoline launch (screw).....	Rock Island.....	III
Comet.....	Gasoline towboat (paddle).....	Cincinnati (first).....	XVIII
Commodore.....	Gasoline launch (screw).....	Galveston.....	XVII
Comstock.....	Seagoing hopper dredge.....	do.....	IV
Concuh.....	Snag boat.....	Montgomery.....	VIII
Congarce.....	Hydraulic pipe-line dredge.....	Charleston.....	V

TABLE I.—*Alphabetical list of floating plant, annual report of the Chief of Engineers, 1916—Continued.*

Name, number, or letter.	Type.	District.	Table No.
Contentina	Derrick boat	Wilmington, N. C.	IX
Control	Tow and survey boat, paddle (steam)	Vicksburg (M. R. C. 3d)	XVI
Coosa	Gasoline towboat (paddle)	Montgomery	XVIII
Coot	Gasoline launch (screw)	do.	XVII
Coot	do.	Rock Island	III
Copano	do.	Galveston	XVII
Coppee, H. St. L.	Tow and survey boat, paddle (steam)	Vicksburg (M. R. C. 3d)	XVI
Coquet	Tug and survey boat, screw (steam)	Wilmington, N. C.	XIV
Corvi	Gasoline launch (screw)	Jacksonville	XVII
Cosine	do.	Savannah	XVII
Coyote	Gasoline launch (screw)	Portland, Oreg. (second)	XVII
Craighill, Gen.	Tow and survey boat, paddle (steam)	Wheeling	XVI
Crane	Gasoline launch (screw)	Rock Island	III
Crichton	Hydraulic pipe-line dredge	Savannah	V
Croatan	do.	Wilmington, N. C.	V
Crozet	Tug and survey boat (steam)	Wheeling	XVI
Culberson, C. A.	Snag boat	Dallas	XIII
Cumberland	Seagoing hopper dredge	Savannah	IV
Curlew	Gasoline launch (screw)	Rock Island	III
Currituck	Hydraulic pipe-line dredge	Norfolk	V
Curtis	Gasoline launch (screw)	Duluth	XVII
Custodian	do.	Detroit	XVII
Cynthia	Tug and survey boat, screw (steam)	Wilmington, N. C.	XIV
D.	Quarter boat	Mobile, Ala.	III
Dakota	Gasoline launch (screw)	Rock Island	III
Dalecarlia	Hydraulic pipe-line dredge	Washington, D. C.	V
D'Armit	Gasoline launch (screw)	Jacksonville	XVII
Dauphin	do.	Mobile	XVII
Davenport	Dipper dredge	Rock Island	VI
Davy	Gasoline launch (screw)	do.	XVII
Dawho	do.	Charleston	XVII
D. B. No. 4	Derrick boat	Galveston	IX
Dearborn	Tug and survey boat, screw (steam)	Chicago	XIV
DeLafield	Gasoline launch (screw)	New York (first)	XVII
Delatour	Snag boat	New Orleans	VIII
Delaware	Seagoing hopper dredge	Philadelphia	IV
Delaware	Gasoline launch (screw)	do.	XVII
Delta	Hydraulic pipe-line dredge	St. Louis (M. R. C.)	V
Deluge	Steam pump boat	Pittsburgh	V
Demopolis	Snag boat	Mobile	VIII
Denison	Dredge and snag boat	Dallas, Tex.	VIII
Derby, Capt. Geo. H.	Gasoline launch (screw)	New York (first)	XVII
De Soto	do.	Jacksonville	XVII
Dolly	do.	Rock Island	III
Dolly	do.	Portland, Oreg. (second)	XVII
Don	do.	Detroit, Mich.	XVII
Donaldsonville	Quarter boat	New Orleans (M. R. C. 4th)	III
Donovan, C.	Tug and survey boat, screw (steam)	New Orleans	XIV
Drift	Gasoline launch (screw)	New York (second)	XVII
Du Brie	do.	Louisville	XVII
E. A. W.	Tow and survey boat, paddle (steam)	Cincinnati (first)	XVI
Echo River	Gasoline launch (screw)	Louisville	XVII
Elmer	Tow and survey boat, paddle (steam)	Rock Island	XVI
Ellen	do.	do.	XVI
Ellis	Gasoline launch (screw)	New London, Conn.	XVII
Elsie	Tow and survey boat, paddle (steam)	Rock Island	XVI
Emerald	do.	Louisville	XVI
Emily	do.	Rock Island	XVI
Engineer	Tug and survey boat, screw (steam)	Manila	XIV
Engineer	Gasoline launch (screw)	Grand Rapids	XVII
Engineer	do.	Washington Barracks, D. C.	XVII
Engineer, U. S.	do.	Newport	XVII
Enquirer	do.	Kansas City	XVII
Epilon	Hydraulic pipe line dredge	St. Louis (M. R. C.)	V
Escambia	Snag boat	Montgomery	VIII
Escatawpa	do.	Mobile	VIII
Essays	Tug and survey boat, screw (steam)	Duluth	XIV
Etna	Hydraulic pipe line dredge	Rock Island	V
Etowah	Gasoline launch (screw)	Montgomery	XVII
Eudora	do.	Nashville	XVII
Eufaula	do.	Montgomery	XVII
Eureka	do.	Portland, Oreg. (second)	XVII
Ewens, John	Tow and survey boat (paddle)	St. Louis (M. R. C.)	XVI
Executive	Steam lighter	Boston	XV
Faber	Gasoline launch (screw)	Wilmington, N. C.	XVII
Firefly	do.	Rock Island	III
Flad, Henry	Hydraulic pipe line dredge	St. Louis (M. R. C.)	V

TABLE I.—*Alphabetical list of floating plant, annual report of the Chief of Engineers, 1916—Continued.*

Name, number, or letter.	Type.	District.	Table No.
Flint	Snag boat.	Montgomery	VIII
Flurence, Thomas B.	do.	Vicksburg	VIII
Florida	Hydraulic pipe-line dredge	Jacksonville	V
Folly	Gasoline launch (screw)	Rock Island	III
Fort Chartres	Hydraulic pipe line dredge	St. Louis	V
Fort Gage	do.	do.	V
Fox	Tow and survey boat, paddle (steam)	Milwaukee	XVI
Fox	do.	Chicago	XVI
Fox	Gasoline launch (screw)	Rock Island	III
Frances	do.	do.	XVII
Frankfort	Dipper dredge	Cincinnati (second)	VI
Franklin	Gasoline launch (screw)	Vicksburg	XVII
Freak	do.	Jacksonville	XVII
Fury	Tow and survey boat, paddle (steam)	Rock Island	XVI
G.	Gasoline launch (screw)	Galveston	XVII
Gallard, Col. D. D.	44-yard dipper dredge	Duluth, Minn.	VI
Gallena	Gasoline launch (screw)	Rock Island	XVII
Galveston	Seagoing hopper dredge	Galveston	IV
Gamma	Hydraulic pipe line dredge	St. Louis (M. R. C.)	V
Ganawada	Gasoline launch (screw)	New York (first)	XVII
Gannet	do.	Wilmington, Del.	XVII
Gar	do.	Rock Island	III
Gasconade	Gasoline towboat (paddle)	Kansas City	XVIII
Gazelle	Gasoline launch (screw)	Newport, R. I.	XVII
Gedney	Seagoing hopper dredge	Newport	IV
Gem	Tug and survey boat, screw (steam)	Savannah	XIV
Gemini	Catamaran	Buffalo	III
Geneva	Snag boat	Montgomery	VIII
Geyser	Hydraulic pipe-line dredge	Rock Island	V
Gibbons	Tug and survey boat, screw (steam)	Savannah	XIV
Gillespie Gen. G. I.	Hydraulic pipe-line dredge	New York (first)	V
Gillmore, Gen.	Tug and survey boat, screw (steam)	Grand Rapids	XIV
Glanville	Gasoline towboat (paddle)	Wheeling	XVIII
Gnat	Gasoline launch (screw)	Rock Island	III
Grace	Tow and survey boat, paddle (steam)	do.	III
Graham	do.	Memphis (M. R. C. 1st, 2d)	XVI
Granby	Gasoline launch (screw)	Charleston	XVII
Green River	Dipper dredge	Louisville	VI
Gregory	Tow and survey boat, paddle (steam)	Cincinnati (2d)	XVI
Grey Cloud	Gasoline launch (screw)	Rock Island	III
Grossetete	Bucket dredge	New Orleans	VII
Guadalupe	Hydraulic pipe-line dredge	Galveston	V
Gulfport	do.	Mobile	V
Gull	Gasoline launch (screw)	Rock Island	III
Gurney, Lieut.	Tow and survey boat, paddle (steam)	Kansas City	XVI
Guyandot	do.	Cincinnati (first)	XVI
Gwendolen	Tug and survey boat, screw (steam)	Buffalo	XIV
Hamilton	Gasoline launch (screw)	Rock Island	III
Hampton	Hydraulic pipe-line dredge	Norfolk	V
Hancock	Tug and survey boat, screw (steam)	Grand Rapids	XIV
Hancock, No. 2	Gasoline launch (screw)	do.	XVII
Harding, Horace	Tug and survey boat, screw (steam)	Mobile	XIV
Harpeth	Gasoline launch (screw)	Nashville	XVII
Harrod, B. M.	Hydraulic pipe-line dredge	St. Louis (M. R. C.)	V
Hartrick, E. M.	Gasoline launch (screw)	Galveston	XVII
Harwood, Col.	Tug and survey boat, screw (steam)	do.	XIV
Hay Lake	Quarter boat	Detroit	III
Hecla	Hydraulic pipe-line dredge	Rock Island	V
Helen	Gasoline launch (screw)	Galveston	XVII
Henry	Tow and survey boat, paddle (steam)	Nashville	XVI
Hercules	Bucket dredge	Wilmington, N. C.	VII
Heron	Gasoline launch (screw)	Milwaukee	XVII
Hawatha	do.	Rock Island	XVII
Hidalgo	do.	Galveston	XXI
Hider, Arthur	Tow and survey boat, paddle	Vicksburg (M. R. C. 3d)	XVI
Hill	Gasoline launch (screw)	Galveston	XVII
Hinda	do.	Wilmington, Del.	XVII
Hivassae	Tow and survey boat, paddle (steam)	Chattanooga	XVI
Holly	Gasoline launch (screw)	Rock Island	III
Houston, Sam	Hydraulic pipe-line dredge	Galveston	V
Howell, C. W.	Snag boat	Vicksburg	VIII
Humphreys, Gen. A. A.	Tug and survey boat, screw (steam)	Philadelphia	XIV
Humphreys, Ben.	Snag boat	Vicksburg	VIII
Humphreys, Chas.	Hydraulic pipe-line dredge	Mobile	V
Hurricane	Gasoline launch (screw)	Kansas City	XVII
Hycinth	Tow and survey boat, paddle (steam)	New Orleans	XVI
Hydrog.	Gasoline launch (screw)	St. Louis (M. R. C.)	XVII

TABLE I.—*Alphabetical list of floating plant, annual report of the Chief of Engineers, 1916—Continued.*

name, number, or letter.	Type.	District.	Table No.
ois.	Dipper dredge.	Chicago.	VI
ana.	Hydraulic pipe-line dredge.	Cincinnati (first).	V
stry.	Tug and survey boat, screw (steam).	Milwaukee.	XIV
ills, Gen.	Gasoline launch (screw).	New York (second).	XVII
	do.	Dallas.	XVII
ector.	do.	Cleveland.	XVII
ector No. 1.	do.	Little Rock.	XVII
ector.	do.	Detroit (Lake Survey).	XVII
ector M. R. C.	Tug and survey boat, screw (steam).	St. Louis (M. R. C.).	XIV
coastal.	Quarter boat.	New Orleans.	V
	Hydraulic pipe-line dredge.	St. Louis (M. R. C.).	V
ois.	Snag boat.	Cincinnati (first).	VIII
le Bois.	Tow and survey boat, paddle (steam).	St. Louis.	XVI
uena.	do.	Vicksburg (M. R. C. 3d).	XI
	Derriek boat.	Pittsburgh.	XI
a.	Tow and survey boat, paddle.	Memphis (M. R. C. 1st, 2d).	XVI
son.	Gasoline launch (screw).	Dallas, Tex.	XVII
e.	do.	Portland, Oreg. (first).	XVII
son, A. B.	Tow and survey boat, paddle (steam).	Nashville.	XVI
	Snag boat.	Little Rock.	VIII
	Gasoline launch (screw).	Rock Island.	III
n.	do.	Mobile.	XVII
ta.	do.	Dallas.	XVII
er.	Tow and survey boat, paddle (steam).	St. Louis (M. R. C.).	XVI
erine.	Gasoline towboat (paddle).	Kansas City.	XVIII
arine.	Gasoline launch (screw).	New London.	XVII
a.	Hydraulic pipe-line dredge.	St. Louis (M. R. C.).	V
askia.	Tow and survey boat, paddle (steam).	St. Louis.	XVI
, George G.	do.	Kansas City.	XVI
ucky.	Dipper dredge.	Chattanooga.	VI
ucky.	Snag boat.	Cincinnati (second).	VIII
uk.	Dipper dredge.	Rock Island.	VI
e Falls.	Gasoline towboat (paddle).	Seattle, Wash.	XVIII
unnee.	Dipper dredge.	Milwaukee.	VI
West.	Seagoing hopper dredge.	Jacksonville.	IV
Col. W. R.	Tow and survey boat, paddle (steam).	Chattanooga.	XVI
do.	do.	St. Louis, Mo.	XVI
isher.	Gasoline launch (screw).	Milwaukee.	XVII
nmee.	Snag boat.	Jacksonville.	VIII
ning.	Tow and survey boat, paddle (steam).	Pittsburgh.	XVI
John.	Gasoline launch (screw).	Wilmington, N. C.	XVII
ind.	Dipper dredge.	Chattanooga.	VI
sine.	Quarter boat.	New Orleans.	III
rche.	Gasoline launch (screw).	Detroit, Mich.	XVII
Borgne.	Tow and survey boat, paddle (steam).	New Orleans (M. R. C. 4th).	XVI
nt.	Quarter boat.	do.	III
	Tug and survey boat, screw (steam).	New York (super. of N. Y. Harbor).	XIV
	Gasoline launch (screw).	Rock Island.	III
	do.	Louisville.	XVII
lle.	do.	Chicago.	XXXI
a.	do.	Galveston.	XVII
	do.	Mobile.	XVII
, Col.	do.	Washington, D. C.	XVII
aire.	Towboat, paddle (steam).	Rock Island.	XVII
	Gasoline towboat (paddle).	do.	XVII
	Tow and survey boat, paddle (steam).	Montgomery.	XVI
	do.	St. Louis (M. R. C.).	XVI
Lieut.	do.	Kansas City.	XVI
y.	do.	Dallas.	XVI
ut.	File driver.	Wilmington, N. C.	X
t.	Gasoline launch (screw).	Rock Island.	III
J. C.	do.	do.	XVII
Point.	do.	Norfolk, Va.	XVII
ut.	do.	New York (super. of N. Y. Harbor).	XVII
ut.	do.	Chattanooga.	XVII
e.	do.	Rock Island.	III
e.	do.	Charleston.	XVII
e.	Tow and survey boat, paddle (steam).	Rock Island.	XVI
ville.	Dipper dredge.	Louisville.	VI
	Tow and survey boat, paddle (steam).	Rock Island.	XVI
gton.	Gasoline launch (screw).	Grand Rapids.	XVII
cker, Gen. G. J.	Tug and survey boat, screw (steam).	Detroit.	XIV

¹ Formerly Gladwin.

TABLE I.—*Alphabetical list of floating plant, annual report of the Chief of Engineers, 1916—Continued.*

Name, number, or letter.	Type.	District.
Lydecker, Gen. G. J., No. 1.	Gasoline launch (screw).....	Detroit.....
Lydecker, Gen. G. J., No. 2.	.....do.....	.....do.....
Mac.	Tow and survey boat, paddle (steam).	Rock Island.....
Macomb, J. N.	Snag boat.	St. Louis.
Macon.	Hydraulic pipe-line dredge.	Savannah.
Maquire, Capt.	Gasoline launch (screw).....	Jacksonville.
Mai.	.....do.....	.....do.....
Mai Muat.	.....do.....	Honolulu.
Mallard.	.....do.....	Milwaukee.
Mallery, Maj. J. C.	Hydraulic pipe-line dredge.	Jacksonville.
Malta.	Bucket dredge.	Cincinnati, Ohio (second).
Malta K.	Gasoline launch (screw).	Mobile.
Mammoth Cave.	Snag boat.	Louisville, Ky.
Manchao.	Tug and survey boat, screw (steam).	New Orleans (M. R. C. 4th).
Mandan.	Snag boat.	Kansas City.
Manhattan.	Seagoing hopper dredge.	Philadelphia.
Manisess.	Tug and survey boat, screw (steam).	New York (second).
Manito.	Bucket dredge.	St. Paul.
Manitowoc.	Tug and survey boat, screw (steam).	Milwaukee.
Manrker.	Gasoline launch (screw).	Nashville.
Marietta.	Dipper dredge.	Cincinnati (first).
Marenko.	Tug and survey boat, steam (screw).	New Orleans (M. R. C. 4th).
Margaret.	Quarter boat.	Chicago.
Marion.	Tow and survey boat, paddle (steam).	Rock Island.
Mars.	.....do.....	St. Louis (M. R. C.).
Mary Ann.	Derrick boat.	Pittsburgh.
Mason.	Sand digger.	Wheeling, W. Va.
Mathloma.	Snag boat.	Portland, Ore. (second).
Maude Kilgore.	Tug and survey boat, paddle (steam).	Memphis (M. R. C. 1st, 2d).
Maumee.	Dipper dredge.	Cleveland.
Maurepas.	Gasoline launch (screw).	New Orleans.
Mayon.	Hydraulic pipe-line dredge.	Rock Island.
M. C.	Gasoline launch (screw).	Chicago.
McCailla, R. C.	Snag boat.	Mobile.
McGregor, Robert.	Hydraulic pipe-line dredge.	Little Rock.
McPherson.	Tow and survey boat, paddle (steam).	Chattanooga.
McPherson, James B.	Snag boat.	Kansas City.
Meade, Gen. G. G.	Seagoing hopper dredge.	Grand Rapids.
Mendell, G. H.	Tug and survey boat, screw (steam).	Portland, Ore. (second).
Meramec.	Tow and survey boat, paddle (steam).	St. Louis.
Mercur.	Tug and survey boat, screw (steam).	Wilmington, N. C.
Mercury.	Tow and survey boat, paddle (steam).	St. Louis (M. R. C.).
Merrill.	.....do.....	Cincinnati, Ohio (second).
Meyler, Capt. J. J.	Gasoline launch (screw).	Jacksonville.
Mezquite.	.....do.....	Galveston.
Miami.	Tow and survey boat, paddle (steam).	Cincinnati (first).
Michie, Col. P. S.	Seagoing hopper dredge.	Portland, Ore. (first).
Millin.	Gasoline launch (screw).	Philadelphia.
Mignon.	.....do.....	Cincinnati (first).
Miller, Col. A. M.	Hydraulic pipe-line dredge.	Galveston.
Millville.	Gasoline launch (screw).	Norfolk.
Mingo.	Derrick boat.	Cincinnati (first).
Minnehaha.	Gasoline launch (screw).	Rock Island.
Minneiska.	.....do.....	.....do.....
Minnetonka.	Tow and survey boat, paddle (steam).	Memphis (M. R. C. 1st, 2d).
Minneapolis.	.....do.....	Rock Island.
Minquas.	Seagoing hopper dredge.	Wilmington, Del.
Minquas.	Gasoline launch (screw).	.....do.....
Mississippi.	Tow and survey boat, paddle (steam).	St. Louis (M. R. C.).
Missouri.	Snag boat.	Kansas City.
Mohawk.	Gasoline launch (screw).	Portland, Ore. (second).
Molly.	.....do.....	Rock Island.
Monteau.	.....do.....	Kansas City.
Monomoy.	.....do.....	Newport.
Monongahela.	Derrick boat.	Pittsburgh.
Monticello.	Combined pipe-line and bucket dredge.	Portland, Ore. (second).
Moreau.	Gasoline launch (screw).	Kansas City.
Morgan.	Hydraulic pipe-line dredge.	Savannah.
Morganza.	Tug and survey boat, screw (steam).	New Orleans (M. R. C. 4th).
Mosquito.	Gasoline launch (screw).	Rock Island.
Moss Point.	.....do.....	Portland, Ore. (first).
Moth.	.....do.....	Rock Island.
M. R. C. 1.	Derrick boat.	St. Louis (M. R. C.).
M. R. C. 2.	Gasoline launch (screw).	.....do.....
M. R. C. 4.	.....do.....	.....do.....
Mulberry.	.....do.....	Mobile, Ala.
Munroe.	.....do.....	Wheeling.

—Alphabetical list of floating plant, annual report of the Chief of Engineers,
1916—Continued.

Number, or letter.	Type.	District.	Table No.
	Gasoline launch (screw)	Norfolk.	XVII
	do.	Portland, Oreg. (first).	XVII
	Towboat, paddle (steam)	Rock Island.	V
	Hydraulic pipe-line dredge	Montgomery	XVII
	(gasoline launch (screw)).	Galveston.	V
	Hydraulic pipe-line dredge	Portland, Oreg. (second).	XVII
	Gasoline launch (screw).	Rock Island.	XVII
	Quarter boat.	Mobile, Ala.	III
	Gasoline launch (screw).	Wilmington, N. C.	XVII
	do.	Wheeling.	XVII
	do.	Jacksonville.	XVII
	Quarter boat.	New Orleans (M. R. C. 4th).	III
	Towboat, paddle (steam).	Rock Island.	XVI
	Seagoing hopper dredge.	New York (second).	IV
	Tank scow.	St. Paul.	III
	Gasoline launch (screw).	Dallas.	XVII
	do.	Portland, Oreg. (first).	XVII
	do.	Cincinnati (first).	XVII
	do.	Duluth.	XVII
	do.	New Orleans (M. R. C. 4th).	XVII
	do.	Detroit (Lake Survey).	XVII
	do.	Wilmington, N. C.	XVII
	do.	Philadelphia.	XVII
	Seagoing hopper dredge.	New Orleans.	IV
	Tow and survey boat, paddle (steam).	New Orleans (M. R. C. 4th).	XVI
	Dipper dredge.	Chattanooga.	VI
	Scow.	St. Paul.	III
	Tug and survey boat (screw).	New York (super. of N. Y. Harbor).	XIV
	Gasoline towboat (paddle).	Chattanooga.	XVIII
	Tug and survey boat, screw (steam).	Detroit.	XIV
	Gasoline launch (screw).	St. Paul.	XVII
	Tow and survey boat, paddle (steam).	St. Louis (M. R. C.).	XVI
	Gasoline launch (screw).	Honolulu.	XVII
	Dipper dredge.	Chattanooga.	VI
	do.	Louisville, Ky.	VI
	Tow and survey boat, paddle (steam).	Memphis (M. R. C. 1st, 2d).	XVI
	Derrick boat.	Detroit.	IX
	Dipper dredge.	Norfolk.	VI
	Pile driver.	New York (first).	X
	Derrick boat.	Norfolk.	IX
	Maneuver boat.	Cincinnati (first).	XIII
	Gasoline launch (screw).	Portland, Me.	XVII
	do.	Norfolk.	XVII
	do.	Galveston.	XVII
	Tug and survey boat, paddle (steam).	Mobile.	XIV
	Quarter boat.	do.	III
	Gasoline launch (screw).	St. Louis (M. R. C.).	XVII
	Quarter boat.	Philadelphia.	III
	Gasoline launch (screw).	Portland, Oreg. (first).	XVII
	Towboat, paddle (steam).	Chattanooga.	XVI
	Snag boat.	Savannah.	VII
	Dipper dredge.	Cincinnati (first).	IX
	Derrick boat.	Pittsburgh.	IX
	Gasoline launch (screw).	Norfolk, Va.	XVII
	Quarter boat.	New Orleans (M. R. C. 4th).	III
	Gasoline launch (screw).	Wilmington, N. C.	XVII
	Bucket dredge.	Milwaukee.	VII
	Gasoline launch (screw).	Buffalo.	XVII
	do.	Montgomery.	XVII
	do.	Memphis (M. R. C. 1st, 2d).	XVII
	Hydraulic pipe-line dredge	Dallas.	V
	Gasoline launch (screw).	Seattle.	XVII
	Hydraulic pipe-line dredge	Portland, Oreg. (first).	V
	Snag boat.	St. Paul.	VIII
	Tow and survey boat, paddle (steam).	Kansas City.	XVI
	Bucket dredge.	Milwaukee.	VII
	Gasoline launch (screw).	Duluth.	XVII
	Dipper dredge.	Cincinnati (first).	VI
	Sternwheel towboat (steam).	do.	XVI
	Gasoline launch (screw).	Rock Island.	III
	do.	Vicksburg.	XVII
	do.	Galveston.	XVII
	do.	Portland, Oreg. (first).	XVII
	do.	Rock Island.	III
	do.	Portland, Oreg. (second).	XVII

TABLE I.—*Alphabetical list of floating plant, annual report of the Chief of Engineers, 1916—Continued.*

Name, number, or letter.	Type.	District.
Parker.....	Tug and survey boat, screw (steam).....	Vicksburg (M. R. C. 3d).....
Pascagoula.....	Hydraulic pipe-line dredge.....	Mobile.....
Pathfinder.....	Gasoline launch (screw).....	Baltimore.....
Paquippe.....	do.....	Norfolk.....
Pearl.....	Snag boat.....	Mobile.....
Pearl.....	Tow and survey boat, paddle (steam).....	Chicago.....
Pearl.....	Gasoline launch (screw).....	Cincinnati (second).....
Pedee.....	Snag boat.....	Charleston, S. C.....
Pedrito.....	Gasoline launch (screw).....	Los Angeles.....
Pelee.....	Hydraulic pipe-line dredge.....	Rock Island.....
Peony.....	Gasoline launch (screw).....	do.....
Pepin.....	do.....	do.....
Pequot.....	do.....	New London.....
Perch.....	do.....	Rock Island.....
Perico.....	do.....	Jacksonville.....
Pettus.....	Hydraulic pipe-line dredge.....	Montgomery.....
Philadelphia.....	Tug and survey boat, screw (steam).....	Philadelphia.....
Phoenix.....	Dipper dredge.....	St. Louis.....
Picket.....	Tug and survey boat, screw (steam).....	New Orleans.....
Pigeon.....	Snag boat.....	do.....
Pink.....	Gasoline launch (screw).....	Rock Island.....
Pioneer.....	do.....	Cincinnati (second).....
Plaquemine.....	Tow and survey boat, paddle (steam).....	New Orleans (M. R. C. 4th).....
Plebe.....	Gasoline launch (screw).....	Boston.....
Plover.....	do.....	Rock Island.....
Polly.....	do.....	Wilmington, N. C.....
Polly.....	do.....	Rock Island.....
Pontoner.....	Tug and survey boat, screw (steam).....	Washington Barracks, D. C.....
Port Hudson.....	Quarter boat.....	New Orleans (M. R. C. 4th).....
Portland.....	Hydraulic pipe-line dredge.....	Louisville, Ky.....
Post, J. C.....	Towboat, screw (steam).....	Portland, Oreg. (second).....
Powhatan.....	Gasoline launch (screw).....	Norfolk.....
Primary.....	do.....	Montgomery.....
Pulaski.....	do.....	Bavannah, Ga.....
Pump boat No. 1.....	Hydraulic pipe-line dredge.....	Chattanooga.....
Pungo.....	Quarter boat.....	Norfolk.....
Q.....	do.....	Mobile.....
Quapaw.....	Snag boat.....	Little Rock.....
Quest.....	Tug and survey boat, screw (steam).....	Cleveland.....
Ram.....	Hydraulic pipe-line dredge.....	New Orleans (M. R. C. 4th).....
Racket.....	Gasoline launch (screw).....	Kansas City, Mo.....
Ransdell, Jos. E.....	Snag boat.....	Vicksburg.....
Raritan.....	Seagoing hopper dredge.....	New York (second).....
Rattler.....	Snag boat.....	Philadelphia.....
Ravenswood.....	Dipper dredge.....	Wheeling.....
Reese, Gen.....	Tug and survey boat, screw (steam).....	New Orleans.....
Reese, C. B.....	Snag boat.....	Little Rock.....
Rees, W. M.....	Tow and survey boat, paddle (steam).....	Memphis (M. R. C. 1st, 2d).....
Rele.....	Gasoline launch (screw).....	Washington, D. C.....
Rettig.....	do.....	Mobile, Ala.....
Richland.....	Gasoline towboat (paddle).....	Charleston, S. C.....
Rio Vista.....	Gasoline launch (screw).....	San Francisco (third).....
Riverside.....	Snag boat.....	Little Rock.....
Roanoke.....	do.....	Norfolk.....
Robert, J.....	Gasoline launch (screw).....	Wilmington, N. C.....
Roberts, T. P.....	Tow and survey boat, paddle (steam).....	Pittsburgh.....
Rock Island Rapids.....	Gasoline launch (screw).....	Rock Island.....
Rocks.....	do.....	Wilmington, N. C.....
Roland.....	do.....	Vicksburg.....
Rose.....	do.....	Rock Island.....
Rosecrans.....	Bucket dredge.....	Wheeling.....
Rumsey, James.....	Tug and survey boat, screw (steam).....	do.....
Ruth.....	Tow and survey boat, paddle (steam).....	Rock Island.....
Sabine.....	Seagoing hopper dredge.....	Dallas.....
Sachem.....	Tow and survey boat, paddle (steam).....	St. Louis (M. R. C.).....
Sacramento.....	Hydraulic pipe-line dredge.....	San Francisco (third).....
Saginaw.....	Bucket dredge.....	Grand Rapids.....
Salem.....	Gasoline launch (screw).....	Portland, Oreg. (second).....
Sally.....	do.....	Rock Island.....
Salvador.....	do.....	New Orleans, La.....
Salvisi.....	Tow and survey boat, paddle (steam).....	St. Louis.....
San Bernard.....	Hydraulic pipe-line dredge.....	Galveston.....
San Jacinto.....	do.....	do.....
San Joaquin.....	do.....	San Francisco (third).....
San Luis.....	Tug and survey boat, screw (steam).....	Galveston.....

I.—*Alphabetical list of floating plant, annual report of the Chief of Engineers, 1916—Continued.*

Number, or letter.	Type.	District.	Table No.
o.	Seagoing hopper dredge	San Francisco (first)	IV
o.	Hydraulic pipe-line dredge	Los Angeles	V
sa	Gasoline launch (screw)	Montgomery	XVII
	Derrick boat	Savannah	IX
	Tug and survey boat, screw (steam)	Detroit	XIV
	Hydraulic pipe-line dredge	Jacksonville	V
	Tow and survey boat, paddle (steam)	St. Louis (M. R. C.)	XVI
	Seagoing hopper dredge	Savannah	IV
la	Gasoline launch (screw)	Buffalo	XVI
ll	do.	Philadelphia	XVII
	do.	New York (second)	XVII
	Tow and survey boat, paddle (steam)	Cincinnati (first)	XVI
	Gasoline launch (screw)	Rock Island	XVII
	Tug and survey boat, screw (steam)	New York (super. of N. Y. Harbor)	XIV
long	Bucket dredge	Wilmington, N. C.	VII
	Tug and survey boat, screw (steam)	Detroit (Lake Survey)	XIV
n. C. B.	Tow and survey boat, paddle (steam)	Memphis (M. R. C. 1st, 2d)	XVI
	Tug and survey boat, screw (steam)	Duluth	XIV
	Snag boat	San Francisco (third)	VIII
	Hydraulic pipe-line dredge	St. Louis	V
	Gasoline launch (screw)	Chicago	XVII
	do.	Savannah	XVII
	Tug and survey boat, screw (steam)	Baltimore	XIV
	Dipper dredge	Nashville	VI
	Gasoline launch	Dallas	XVII
	do.	Rock Island	III
er	Tow and survey boat, paddle (steam)	Louisville	XVI
port	Gasoline launch (screw)	Montgomery	XVII
Gen. J. H.	Hydraulic pipe-line dredge	Louisville	V
	Tow and survey boat, paddle (steam)	St. Louis	XVI
	Gasoline launch (screw)	Jacksonville	XVII
	do.	Kansas City	XVII
he	do.	Cincinnati, Ohio (first)	XVII
	do.	Norfolk	XVII
er	Tow and survey boat, paddle (steam)	Pittsburgh	XVI
	Gasoline launch (screw)	Rock Island	III
	Dipper dredge	Buffalo	VI
	Gasoline launch (screw)	Rock Island	III
	Tug and survey boat, screw (steam)	Cleveland	XIV
	Gasoline launch (screw)	Savannah	XVII
	do.	Wilmington, N. C.	XVII
	do.	New Orleans	XVII
n.	do.	Norfolk	XVII
	do.	St. Louis	XVII
h.	Quarter boat	New Orleans (M. R. C. 4th)	II
	Dipper dredge	Rock Island	VI
	Gasoline launch (screw)	Montgomery	XVII
	do.	San Francisco (first)	XVII
	Seagoing hopper dredge	Charleston	IV
	Quarter boat	Wilmington, N. C.	III
	Tug and survey boat, screw (steam)	Detroit (Lake Survey)	XIV
	Gasoline launch (screw)	Rock Island	XVII
	Snag boat	Pittsburgh	VIII
	Gasoline launch (screw)	Rock Island	III
sh	Combined snag boat and bucket dredge	Seattle, Wash.	VIII
	Tug and survey boat, screw (steam)	Vicksburg (M. R. C. 3d)	XIV
	Gasoline towboat (paddle)	Mobile	XVIII
	Hydraulic pipe-line dredge	Rock Island	V
S.	do.	Little Rock	V
	Pile driver	San Francisco (third)	X
apt. Andrew.	Hydraulic pipe-line dredge	New York (first)	V
apt.	Tug and survey boat, screw (steam)	Charleston	XIV
a.	Derrick boat	Mobile	IX
	Gasoline launch (screw)	Louisville	XVII
	Tow and survey boat, paddle (steam)	New Orleans (M. R. C. 4th)	XVI
	do.	Charleston, S. C.	XVII
	Dipper dredge	Chattanooga	VI
e.	do.	do.	VI
	Tow and survey boat, paddle (steam)	New Orleans (M. R. C. 4th)	XVI
ol.	Tug and survey boat, screw (steam)	New York City (first)	XIV
	Hydraulic pipe-line dredge	St. Louis	V
eska.	Quarter boat	Montgomery	III
	Tug and survey boat, screw (steam)	New Orleans (M. R. C., 4th)	XIV
	Water scow	St. Paul	III
	Gasoline launch (screw)	Rock Island	III
David	Snag boat	do.	VIII
ngo.	Bucket dredge	Chattanooga	VII
	Gasoline launch (screw)	Jacksonville	XVII

TABLE I.—*Alphabetical list of floating plant, annual report of the Chief of Engineers, 1916—Continued.*

Name, number, or letter.	Type.	District.
Tomahawk.	Gasoline launch (screw).	Kansas City
Tombigbee.	Snag boat.	Mobile.
Tonty.	Tug and survey boat, screw (steam).	New Orleans.
Torros.	Quarter boat.	New Orleans (M. R. C., 4th)
Totten, Gen.	Tug and survey boat, screw (steam).	New York (first)
Trent.	Snag boat.	Wilmington, N. C.
Trenton.	Gasoline launch (screw).	Philadelphia
Trinity.	Snag boat.	Dallas
Trout.	Motor skiff.	Rock Island
Tugalo.	Snag boat.	Savannah
Tunica.	Tug and survey boat, screw (steam).	New Orleans (M. R. C., 4th)
Turtle, Capt.	Derrick boat.	Wheeling.
Tuscaloosa.	Tug and survey boat, screw (steam).	Mobile.
Tuscumbia.	Dipper dredge.	Chattanooga
Twining, Wm. J.	Snag boat.	Montgomery
Uacha.	Tug and survey boat, screw (steam).	New Orleans.
Uchee.	Gasoline launch (screw).	Savannah
Ukanush.	Gasoline towboat (paddle).	Mobile.
Umatilla.	Derrick boat, self-propelled.	Portland, Oreg. (first).
Uncle Sam.	Hydraulic pipe-line dredge.	Wilmington, N. C.
Upatoi.	Dipper dredge.	Montgomery
Vamos.	Gasoline launch (screw).	Rock Island.
Vega.	Tow and survey boat, paddle (steam).	Cincinnati (second).
Venus.	do.	St. Louis (M. R. C.)
Vernon.	Gasoline launch (screw).	Montgomery
Vesuvius.	Hydraulic pipe-line dredge.	Rock Island
Victoria.	Gasoline launch (screw).	Galveston.
Vidette.	Tug and survey boat, screw (steam).	Philadelphia
Vienna.	Snag boat.	Mobile.
Vigilant.	Tug and survey boat, screw (steam).	New York (super. of N. Y. Harbor).
Vigilant.	Gasoline launch (screw).	Portland, Oreg. (second)
Violetta.	do.	Jacksonville.
Viper.	do.	Rock Island
Visitor.	Tug and survey boat, screw (steam).	Cleveland.
Vulcan.	Dipper dredge.	St. Louis.
Vulcan.	Tow and survey boat, paddle (steam).	St. Louis (M. R. C.)
W.	Gasoline launch (screw).	New York (first)
Wabash No. 3.	Quarter boat.	St. Louis (M. R. C.)
Waco.	Snag boat.	Dallas.
Wacouta.	Gasoline launch (screw).	Rock Island
Wahalak.	Hydraulic pipe-line dredge.	Mobile.
Wahkiakum.	do.	Portland, Oreg. (second)
Wah-ta-wah.	Gasoline launch (screw).	New York (first)
Wakenda.	do.	Kansas City
Wampum.	Office boat.	St. Paul.
Warioto.	Tow and survey boat, paddle (steam).	Nashville, Tenn.
Warren, Gen.	Tug and survey boat, screw (steam).	Washington, D. C.
Warroad.	Hydraulic pipe-line dredge.	St. Paul.
Wasp.	Gasoline launch (screw).	Rock Island
Watauga.	Dipper dredge.	Chattanooga
Waterce.	Snag boat.	Charleston, S. C.
Waumandee.	Gasoline launch (screw).	Rock Island
Wave Rock.	Tow and survey boat, paddle (steam).	Louisville.
Welaka.	Gasoline launch.	Jacksonville
West Neebish.	Tug and survey boat, screw (steam).	Detroit.
Whetstone.	Gasoline launch (screw).	Kansas City
White Oak.	Gasoline towboat (paddle).	Chattanooga
Whitewater.	Tug and survey boat, screw (steam).	Vicksburg (M. R. C. 3d)
Wigwam.	Quarter boat.	St. Paul.
Wild Horse.	Gasoline launch (screw).	Kansas City
Wilson.	Tug and survey boat, screw (steam).	Seattle.
Winyah Bay.	Seagoing hopper dredge.	Charleston
Wolf.	Gasoline launch (screw).	Mobile.
Wolf.	Tow and survey boat, paddle (steam).	Milwaukee
Woodland.	do.	Portland, Oreg. (second)
Woodruff, E. A.	Snag boat.	Cincinnati (first)
Wren.	Gasoline launch (screw).	Rock Island
Wright, Gen. H. G.	Snag boat.	Wilmington, N. C.
Wright, H. G.	do.	St. Louis.
Wynoka.	Tow and survey boat, paddle (steam).	Memphis (M. R. C. 1st, 2d)
York.	Snag boat.	Washington, D. C.
Z.	Quarter boat.	Kansas City, Mo.
Zeta.	Hydraulic pipe-line dredge.	St. Louis (M. R. C.)
Zumbro.	Gasoline launch (screw).	Rock Island

TABLE I.—*Alphabetical list of floating plant, annual report of the Chief of Engineers, 1916—Continued.*

Name, number, or letter.	Type.	District.	Table No.
No. 1	Derrick boat	Buffalo	IX
No. 1	do.	Charleston	IX
No. 1	Maneuver boat	do.	XIII
No. 1, pump boat	Pump boat	Chattanooga	III
No. 1	Quarter boat	do.	III
No. 1	Derrick boat	Chicago	IX
No. 1	Quarter boat	do.	III
No. 1	Floating concrete mixer	Cincinnati (first)	XXII
No. 1	Pump boat	do.	III
No. 1	Derrick boat	do.	IX
No. 1	do.	Cleveland	IX
No. 1	Maneuver boat	Dallas	XIII
No. 1	Derrick boat	Galveston	IX
No. 1	Quarter boat	do.	III
No. 1	do.	Kansas City	III
No. 1	Pile driver	do.	X
No. 1	Quarter boat	Little Rock	III
No. 1	Maneuver boat	Louisville	XIII
No. 1	Machine shop	Memphis (M. R. C. 1st, 2d)	III
No. 1	Derrick boat	Milwaukee	IX
No. 1	Pile driver	do.	X
No. 1	Gasoline launch (screw)	Mobile	XVII
No. 1	Pile driver	Montgomery	X
No. 1	Quarter boat	do.	III
No. 1	Snag boat	Nashville	VIII
No. 1	Gasoline towboat (paddle)	do.	XVIII
No. 1	Quarter boat	do.	III
No. 1	do.	Norfolk	III
No. 1	Derrick boat	New Orleans	IX
No. 1	Grader (hydraulic)	New Orleans (M. R. C. 4th)	XI
No. 1	Pile driver	New Orleans	X
No. 1	Quarter boat	do.	III
No. 1	Derrick boat	Pittsburgh	IX
No. 1	Dipper dredge	do.	VI
No. 1	Pile driver	do.	X
No. 1	Quarter boat	do.	III
No. 1	Derrick boat	Portland, Oreg. (first)	IX
No. 1	Drill boat	do.	XII
No. 1	Pile driver	Portland, Oreg. (second)	X
No. 1	Derrick boat	do.	IX
No. 1	Quarter boat	do.	III
No. 1	Concrete mixing barge	do.	XXII
No. 1	Quarter boat	Savannah, Ga.	III
No. 1	Snag boat	do.	XIII
No. 1	Pile driver	do.	X
No. 1	Office and survey boat	St. Louis	III
No. 1	Pile driver	do.	X
No. 1	Quarter boat	do.	III
No. 1	Derrick boat	Vicksburg	IX
No. 1, A. R.	Maneuver boat	Pittsburgh	XIII
No. 1, Columbia River	Drill boat	Seattle	XII
No. 1, G. & B.	Derrick boat	Louisville	IX
No. 1, G. R.	Pile driver	Grand Rapids	X
No. 1, H. B.	Quarter boat	Jacksonville	III
No. 1, Inspector	Gasoline launch (screw)	Little Rock	XVII
No. 1, M. R. C.	Derrick boat	St. Louis (M. R. C.)	IX
No. 1, Neches River	Quarter boat	Dallas	III
No. 1, O. R.	Derrick boat	Louisville, Ky.	IX
No. 1, O. R.	Pile driver	do.	X
No. 1, O. R.	Machine shop	do.	III
No. 1, O. R.	Sawmill	do.	III
No. 1, O. R.	Derrick boat	Pittsburgh	IX
No. 1, O. R.	Maneuver boat	do.	XIII
No. 1, O. R.	Pump boat	do.	IX
No. 1, paver	Concrete mixer	New Orleans (M. R. C. 1th)	XXII
No. 1, pile sinker	Pile driver	Little Rock	III
No. 1, Hudson River	Quarter boat	New York (first)	XIV
No. 1, U. S. L. S.	Tug and survey boat, screw (steam)	Detroit (Lake Survey)	XIV
No. 2	Derrick boat	Buffalo	IX
No. 2	do.	Charleston, S. C.	III
No. 2	Drill boat	Chattanooga	XII
No. 2	Tool boat	do.	III
No. 2	Gasoline launch (screw)	do.	XVII
No. 2	Maneuver boat	Dallas	XIII
No. 2	Derrick boat	Galveston	IX
No. 2	Pile driver	Kansas City	X
No. 2	do.	Little Rock	X
No. 2	Maneuver boat	Louisville	XIII
No. 2	Derrick boat	Manila	IX
No. 2	do.	Milwaukee	IX

TABLE I.—*Alphabetical list of floating plant, annual report of the Chief of Engineers, 1916—Continued.*

Name, number, or letter.	Type.	District.
No. 2.	Pile driver.	Milwaukee.
No. 2.	Quarter boat.	do.
No. 2.	Grader (hydraulic).	Memphis (M. R. C. 1st, 2d).
No. 2.	Quarter boat.	do.
No. 2.	Pile driver.	Montgomery.
No. 2.	Quarter boat.	Nashville.
No. 2.	Pile driver.	New Orleans.
No. 2.	Dipper dredge.	Pittsburgh.
No. 2.	Derrick boat.	do.
No. 2.	Pile driver.	do.
No. 2.	Derrick boat.	Portland, Oreg. (first).
No. 2.	Drill boat.	do.
No. 2.	Pile driver.	Portland, Oreg. (second).
No. 2.	Quarter boat.	do.
No. 2.	Derrick boat.	do.
No. 2.	Quarter boat.	Savannah.
No. 2.	Derrick boat.	St. Louis.
No. 2.	Office and survey boat.	do.
No. 2.	Quarter boat.	Memphis (M. R. C. 1st, 2d).
No. 2.	Derrick boat.	Vicksburg.
No. 2.	Pile driver.	Washington.
No. 2, Columbia River.	Drill boat.	Seattle.
No. 2, derrick barge.	Snag boat.	Galveston.
No. 2, G. & B.	Derrick boat.	Louisville.
No. 2, O. R.	Maneuver boat.	Pittsburgh.
No. 2, Ohio.	Quarter boat.	Louisville.
No. 2, O. R.	Derrick boat.	do.
No. 2, O. R.	Pile driver.	do.
No. 2, U. S. E. D., Wheeling.	Derrick boat.	Wheeling.
No. 2, U. S. L. S.	Tug and survey boat, screw (steam).	Detroit (Lake Survey).
No. 3.	Gasoline launch (screw).	Chatanooga.
No. 3.	Quarter boat.	do.
No. 3.	do.	Chicago.
No. 3.	Derrick boat.	Cincinnati (first).
No. 3.	do.	Detroit.
No. 3.	Quarter boat.	Kansas City.
No. 3.	Derrick boat.	Memphis (M. R. C., 1st, 2d).
No. 3.	Quarter boat.	do.
No. 3.	Derrick boat.	Milwaukee.
No. 3.	Pile driver.	Montgomery.
No. 3.	Quarter boat.	do.
No. 3.	Derrick boat.	Nashville.
No. 3.	Quarter boat.	do.
No. 3.	Derrick boat.	New Orleans.
No. 3.	do.	Pittsburgh.
No. 3.	Drill boat.	Portland, Oreg. (first).
No. 3.	Derrick boat.	Portland, Oreg. (second).
No. 3.	Derrick lighter.	Savannah.
No. 3.	Derrick boat.	Portland, Oreg. (second).
No. 3.	Quarter boat.	Savannah.
No. 3.	Pile driver.	St. Louis.
No. 3.	Quarter boat.	Memphis (M. R. C. 1st, 2d).
No. 3.	Office and survey boat.	St. Louis.
No. 3.	Quarter boat.	Vicksburg.
No. 3, Hudson River.	do.	New York (first).
No. 3, Ohio.	do.	Louisville.
No. 3, O. R.	Pile driver.	do.
No. 3, O. R.	Maneuver boat.	Pittsburgh.
No. 3, Red River.	Quarter boat.	Dallas.
No. 3, U. S. E. D., Wheeling.	Derrick boat.	Wheeling.
No. 3, U. S. L. S.	Gasoline launch (screw).	Detroit (Lake Survey).
No. 4.	Derrick boat.	Chatanooga.
No. 4.	Gasoline launch (screw).	do.
No. 4.	Derrick boat.	Cincinnati (first).
No. 4.	do.	Cincinnati (second).
No. 4.	Pile driver.	Duluth.
No. 4.	Derrick boat.	Galveston.
No. 4.	Pile driver.	Kansas City.
No. 4.	Quarter boat.	do.
No. 4.	Derrick boat.	Little Rock.
No. 4.	do.	Los Angeles.
No. 4.	Pile driver.	Memphis (M. R. C. 1st, 2d).
No. 4.	Derrick boat.	Milwaukee.
No. 4.	Pile driver.	Montgomery.
No. 4.	Quarter boat.	do.
No. 4.	Derrick boat.	Nashville.
No. 4.	Quarter boat.	do.
No. 4.	Derrick boat.	Pittsburgh.

—Alphabetical list of floating plant, annual report of the Chief of Engineers,
1916—Continued.

Number, or letter.	Type.	District.	Table No.
	Derrick boat.	Portland, Oreg. (second)	IX
	Quarter boat.	Savannah.	III
	do.	St. Louis.	III
	Office and survey boat.	do.	III
	Quarter boat.	Wilmington, N. C.	III
	Derrick boat.	Galveston.	IX
	Grader (hydraulic).	Kansas City.	XI
	Quarter boat.	Louisville.	III
	Maneuver boat.	Pittsburgh.	XIII
ity River.	Quarter boat.	Dallas.	III
L. S.	Gasoline launch (screw).	Detroit (Lake Survey).	XVII
and B.	Derrick boat.	Louisville.	IX
	do.	Chattanooga.	IX
	Quarter boat.	do.	III
	Derrick boat.	Cincinnati (second).	IX
	Quarter boat.	Kansas City.	III
	Pile driver.	do.	X
	Derrick boat.	Los Angeles.	IX
	do.	Manila.	IX
	Quarter boat.	Memphis (M. R. C. 1st, 2d).	III
	Derrick boat.	Nashville.	IX
	do.	Pittsburgh.	IX
	do.	Portland, Oreg. (second).	IX
	Pile driver.	St. Louis.	X
	Quarter boat.	do.	III
	Office and survey boat.	do.	III
	Quarter boat.	Vicksburg.	III
	Derrick boat.	Pittsburgh.	IX
	Quarter boat.	Louisville.	III
	Maneuver boat.	Pittsburgh.	XIII
L. S.	Gasoline launch (screw).	Detroit (Lake Survey).	XVII
	Pile driver.	Montgomery.	X
	Derrick boat.	Chattanooga.	IX
	Pile driver.	Cincinnati (second).	X
	do.	Kansas City.	X
	Quarter boat.	Memphis (M. R. C. 1st, 2d).	III
	do.	Kansas City.	III
	Hydraulic pipe-line dredge.	Mobile.	V
	Quarter boat.	Savannah.	III
on River.	Drill boat.	Rock Island.	XII
	Gravel digging and screening plant.	New York (first).	III
L. S.	Maneuver boat.	Pittsburgh.	XIII
	Gasoline launch (screw).	Detroit (Lake Survey).	XVII
	Derrick boat.	Chattanooga.	IX
	Gasoline launch (screw).	do.	XVII
	Quarter boat.	do.	III
	Derrick boat.	Duluth.	IX
	Quarter boat.	Kansas City.	III
	do.	St. Louis.	III
	Derrick boat.	Wheeling.	III
	Maneuver boat.	Pittsburgh.	XIII
	Pile driver.	Kansas City.	X
	60-ton decked lighter.	Charleston, S. C.	III
	Derrick boat.	Chattanooga.	IX
	Gasoline launch (screw).	do.	XVII
	Quarter boat.	do.	III
	Derrick boat.	Duluth.	IX
	Quarter boat.	Kansas City.	III
	do.	Memphis (M. R. C. 1st, 2d).	III
	Drill scow.	Philadelphia.	XXI
n River.	Quarter boat.	St. Louis.	III
	do.	New York (first).	III
S.	Maneuver boat.	Pittsburgh.	XVII
	Gasoline launch (screw).	Detroit (Lake Survey).	XVII
	3.5-ton deck lighter.	Charleston, S. C.	III
	Derrick boat.	Chattanooga.	IX
	Quarter boat.	do.	III
	do.	Kansas City.	III
	Drill boat.	Louisville.	XII
	Maneuver boat.	Pittsburgh.	XIII
	Quarter boat.	St. Louis.	III
	do.	Vicksburg.	III
	Derrick boat.	Chattanooga.	IX
	Quarter boat.	do.	III
	Drill boat.	Cincinnati (second).	III
	Quarter boat.	Louisville.	XII
	do.	St. Louis.	III
S. E. D.	Maneuver boat.	Vicksburg.	III
		Wheeling.	XIII

TABLE I.—*Alphabetical list of floating plant, annual report of the Chief of Engineers, 1916—Continued.*

Name, number, or letter.	Type.	District.
No. 10-A-3.....	Derrick boat.....	Wheeling.....
No. 10, O. R.....	Maneuver boat.....	Pittsburgh.....
No. 11.....	Quarter boat.....	Chattanooga.....
No. 11.....	Derrick boat.....	do.....
No. 11.....	Quarter boat.....	Cincinnati (second).....
No. 11.....	Drill boat.....	Louisville.....
No. 11.....	Quarter boat.....	Memphis (M. R. C. 1st, 2d).....
No. 11.....	Pile driver.....	Montgomery.....
No. 11.....	Quarter boat.....	Rock Island.....
No. 11.....	do.....	Vicksburg.....
No. 11, U. S. E. D. Wheeling.....	Maneuver boat.....	Wheeling.....
No. 12.....	Quarter boat.....	Chattanooga.....
No. 12.....	do.....	Memphis (M. R. C. 1st, 2d).....
No. 13.....	Derrick boat.....	Chattanooga.....
No. 13.....	Pile driver.....	St. Louis (M. R. C.).....
No. 14.....	Quarter boat.....	Chattanooga.....
No. 14.....	Derrick boat.....	do.....
No. 14.....	do.....	Norfolk.....
No. 14.....	Quarter boat.....	Rock Island.....
No. 15.....	do.....	Chattanooga.....
No. 15.....	Derrick boat.....	do.....
No. 15 ¹	Clamshell derrick barge.....	Montgomery, Ala.....
No. 16.....	Derrick boat.....	Chattanooga.....
No. 16, Hudson River.....	do.....	New York (first).....
No. 17.....	Pile driver.....	Montgomery.....
No. 17.....	Quarter boat.....	Rock Island.....
No. 18, Hudson River.....	Derrick boat.....	New York (first).....
No. 19.....	Quarter boat.....	Chattanooga.....
No. 19, Hudson River.....	Derrick boat.....	New York (first).....
No. 20.....	Quarter boat.....	Chattanooga.....
No. 20, Hudson River.....	Derrick boat.....	New York (first).....
No. 21.....	Quarter boat.....	Chattanooga.....
No. 21, Hudson River.....	Gravel digging and screening plant.....	New York (first).....
No. 22.....	Quarter boat.....	Chattanooga.....
No. 22, U. S. E. D. Wheeling.....	Maneuver boat.....	Wheeling.....
No. 23, U. S. E. D. Wheeling.....	do.....	do.....
No. 24, U. S. E. D. Wheeling.....	Derrick boat.....	do.....
No. 25.....	Quarter boat.....	Memphis (M. R. C. 1st, 2d).....
No. 25.....	do.....	Montgomery.....
No. 25.....	Pile driver.....	Kansas City.....
No. 25, Hudson River.....	Drill boat.....	New York (first).....
No. 26.....	Quarter boat.....	Memphis (M. R. C. 1st, 2d).....
No. 26.....	Pile driver.....	St. Louis.....
No. 27.....	Quarter boat.....	Memphis (M. R. C. 1st, 2d).....
No. 28.....	Pile driver.....	St. Louis.....
No. 28, U. S. E. D. Wheeling.....	Quarter boat.....	Wheeling.....
No. 29.....	Pile driver.....	St. Louis.....
No. 29, Amelia.....	Quarter boat.....	Memphis (M. R. C. 1st, 2d).....
No. 29, U. S. E. D. Kanawha.....	Derrick boat.....	Wheeling.....
No. 30.....	Pile driver.....	St. Louis.....
No. 31.....	do.....	do.....
No. 32.....	do.....	do.....
No. 32, U. S. E. D. Wheeling.....	Maneuver boat.....	Wheeling.....
No. 33.....	Pile driver.....	Rock Island.....
No. 33.....	do.....	St. Louis.....
No. 33, U. S. E. D. Wheeling.....	Gasoline launch (screw).....	Wheeling.....
No. 34.....	Pile driver.....	Kansas City.....
No. 34, U. S. E. D. Wheeling.....	Gasoline launch (screw).....	Wheeling.....
No. 35.....	Pile driver.....	St. Louis.....
No. 36, U. S. E. D. Wheeling.....	Gasoline launch (screw).....	Wheeling.....
No. 37, U. S. E. D. Wheeling.....	Maneuver boat.....	do.....
No. 38.....	do.....	Cincinnati (second).....
No. 38, U. S. E. D. Wheeling.....	do.....	Wheeling.....
No. 39.....	do.....	Cincinnati (second).....
No. 39, U. S. E. D. Wheeling.....	do.....	Wheeling.....

¹ Formerly barge No. 15.

—Alphabetical list of floating plant, annual report of the Chief of Engineers,
1916—Continued.

ber, or letter.	Type.	District.	Table No.
son River...	Drill boat	New York (first)	XII
S. E. D.	Maneuver boat	Wheeling	XIII
son River...	Quarter boat	New York (first)	III
S. E. D.	Derrick boat	Wheeling	IX
	Quarter boat	Cincinnati (second)	III
son River...	do.	New York (first)	III
S. E. D.	Derrick boat	Wheeling	IX
	Maneuver boat	Cincinnati (second)	XIII
	Quarter boat	Rock Island	III
son River	Tugboat	New York (first)	III
	Drill boat	Montgomery	XII
	Maneuver boat	Cincinnati (second)	XIII
	Quarter boat	Rock Island	III
	Maneuver boat	Cincinnati (second)	XIII
	do.	Cincinnati (first)	XIII
	Dipper dredge	Norfolk	VI
ce)	Quarter boat	Rock Island	III
	Maneuver boat	Cincinnati (second)	XXI
S. E. D.	Concrete mixer	Wheeling	III
	Quarter boat	Rock Island	III
	Dipper dredge	Little Rock	VI
	Quarter boat	Rock Island	III
	do.	do.	III
	do.	do.	III
	do.	do.	III
	do.	do.	III
	Pile driver	St. Louis	X
	Grader and derrick boat	do.	XI
	Pile driver	do.	X
	Grader and derrick boat	do.	XI
	Pile driver	do.	X
	do.	do.	X
	do.	Rock Island	X
	do.	St. Louis	X
	Derrick boat	Vicksburg	IX
	Quarter boat	Rock Island	III
	do.	do.	III
	do.	do.	III
	do.	do.	III
	do.	do.	III
	do.	do.	III
	do.	Vicksburg (M. R. C. 3d)	III
	do.	do.	III
	do.	do.	III
	do.	do.	III
	do.	do.	III
	do.	do.	III
	do.	do.	III
	do.	Memphis (M. R. C. 1st, 2d)	III
	do.	do.	III
	do.	Rock Island	III
	do.	do.	III
	do.	do.	III
	do.	do.	III
	Derrick boat	do.	IX
	Quarter boat	do.	III
	Derrick boat	do.	IX
	Quarter boat	do.	III
	do.	do.	III
	do.	do.	III
	do.	do.	III
	do.	do.	III
	do.	do.	III
	do.	do.	III
	do.	do.	III
	do.	do.	III
	Drill boat	do.	XII
	Derrick boat	do.	IX
	Quarter boat	do.	III
	Pile driver	do.	III
	Quarter boat	do.	III
	do.	do.	III
	do.	do.	III
	do.	do.	III
	do.	do.	III
	do.	do.	III
	do.	do.	III
	Derrick boat	Vicksburg (M. R. C. 3d)	IX

3824 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1917.

TABLE I.—*Alphabetical list of floating plant, annual report of the Chief of Engineers, 1916—Continued.*

Name, number, or letter.	Type.	District.	Table No.
No. 971.	Pile driver.	St. Louis (M. R. C.).	X
No. 981.	do.	do.	X
No. 982.	do.	do.	X
No. 983.	do.	do.	X
No. 0601.	Quarter boat.	Memphis (M. R. C. 1st, 2d).	III
No. 071.	Derrick boat.	Vicksburg (M. R. C. 3d).	IX
No. 072.	Concrete mixer.	do.	XXII
No. 083.	do.	do.	XXII
No. 086.	do.	do.	XXII
No. 1010.	Quarter boat.	do.	III
No. 1011.	Grader (hydraulic).	do.	XI
No. 1012.	do.	do.	XI
No. 1013.	do.	do.	XI
No. 1014.	do.	do.	XI
No. 1017.	Derrick boat.	Memphis (M. R. C. 1st, 2d).	IX
No. 1020.	Quarter boat.	do.	III
No. 1021.	do.	do.	III
No. 1022.	Grader (hydraulic).	do.	XI
No. 1107.	Quarter boat.	Vicksburg (M. R. C. 3d).	III
No. 1108.	do.	do.	III
No. 1109.	Steam derrick boat.	do.	IX
No. 1201.	Quarter boat.	do.	III
No. 1202.	do.	do.	III
No. 1208.	Concrete mixer.	Memphis (M. R. C. 1st, 2d).	XXII
No. 1201.	Quarter boat.	do.	III
No. 1307.	do.	do.	III
No. 1308.	do.	do.	III
No. 1311.	Derrick boat.	do.	IX
No. 1401.	Hydraulic grader.	do.	XI
No. 1402.	Quarter boat.	do.	III
No. 1407.	Sand and gravel dredge.	do.	III
No. 1411.	Derrick boat.	do.	IX
No. 1503.	do.	Vicksburg (M. C. R. 3d).	IX
No. 1504.	do.	do.	IX
No. 1509.	Concrete mixer.	do.	XXII
No. 1513.	Quarter boat.	do.	III
No. 1604.	do.	do.	III
No. 9113.	Maneuver boat.	Vicksburg.	XXII
No. 9122.	do.	do.	XXII
No. 9123.	do.	do.	XXII
No. 9127.	do.	do.	XXII

TABLE II. — Alphabetical list, by classes, of floating plant owned by the Engineer Department.

(NOTE. — For complete list of floating plant by districts, see Table III.)

RAAGOING HOPPER DREDGE.

(For operations of these dredges, see Table IV, pp. 299 to 403, inclusive.)

Number, as listed.	This place built.	Dimensions			Material.	Complete plant.		District.
		Length.	Breadth.	Depth.		Eng. Dept.	Mas.	
	Total.	Ft. in.	Ft. in.	Ft. in.				
1	201	20	10	5	Wood	1	10	Wilmington, Del.
2	202	20	10	5	Wood	1	10	New York City
3	203	20	10	5	Wood	1	10	New York City
4	204	20	10	5	Wood	1	10	New York City
5	205	20	10	5	Wood	1	10	New York City
6	206	20	10	5	Wood	1	10	New York City
7	207	20	10	5	Wood	1	10	New York City
8	208	20	10	5	Wood	1	10	New York City
9	209	20	10	5	Wood	1	10	New York City
10	210	20	10	5	Wood	1	10	New York City
11	211	20	10	5	Wood	1	10	New York City
12	212	20	10	5	Wood	1	10	New York City
13	213	20	10	5	Wood	1	10	New York City
14	214	20	10	5	Wood	1	10	New York City
15	215	20	10	5	Wood	1	10	New York City
16	216	20	10	5	Wood	1	10	New York City
17	217	20	10	5	Wood	1	10	New York City
18	218	20	10	5	Wood	1	10	New York City
19	219	20	10	5	Wood	1	10	New York City
20	220	20	10	5	Wood	1	10	New York City

TABLE II.

ALPHABETICAL LIST, BY CLASSES, OF FLOATING PLANT OWNED BY ENGINEER DEPARTMENT.

1	221	20	10	5	Wood	1	10	New York City
2	222	20	10	5	Wood	1	10	New York City
3	223	20	10	5	Wood	1	10	New York City
4	224	20	10	5	Wood	1	10	New York City
5	225	20	10	5	Wood	1	10	New York City
6	226	20	10	5	Wood	1	10	New York City
7	227	20	10	5	Wood	1	10	New York City
8	228	20	10	5	Wood	1	10	New York City
9	229	20	10	5	Wood	1	10	New York City
10	230	20	10	5	Wood	1	10	New York City

HYDRAULIC PIPE-LINE DREDGE.

3825

(For operations of these dredges, see Table V, pp. 404 to 418, inclusive.)

1	231	20	10	5	Wood	1	10	New York City
2	232	20	10	5	Wood	1	10	New York City
3	233	20	10	5	Wood	1	10	New York City
4	234	20	10	5	Wood	1	10	New York City
5	235	20	10	5	Wood	1	10	New York City
6	236	20	10	5	Wood	1	10	New York City
7	237	20	10	5	Wood	1	10	New York City
8	238	20	10	5	Wood	1	10	New York City
9	239	20	10	5	Wood	1	10	New York City
10	240	20	10	5	Wood	1	10	New York City
11	241	20	10	5	Wood	1	10	New York City
12	242	20	10	5	Wood	1	10	New York City
13	243	20	10	5	Wood	1	10	New York City
14	244	20	10	5	Wood	1	10	New York City
15	245	20	10	5	Wood	1	10	New York City
16	246	20	10	5	Wood	1	10	New York City
17	247	20	10	5	Wood	1	10	New York City
18	248	20	10	5	Wood	1	10	New York City
19	249	20	10	5	Wood	1	10	New York City
20	250	20	10	5	Wood	1	10	New York City

Continued.

Continued on Hydraulic and Trench Dredges.

3827

TABLE II.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department.*

[NOTE.—For complete lists of floating plant by districts, see Table III.]

SEAGOING HOPPER DREDGES.

(For operations of these dredges, see Table IV, pp. 3891 to 4028, inclusive.)

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officers.	Men.	
	Tons.	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>				
Abecon.....	994	150 0	36 6	12 0	Steel.....	4	16	Wilmington, Del.
Atlantic.....	2, 670	288 0	47 6	25 0	do.....	9	61	New York (2d).
Benysaurd.....	2, 978	271 6	47 6	23 0	do.....	10	53	New Orleans.
Burton.....	1, 510	177 0	38 0	19 0	do.....	5	23	Cleveland.
Cape Fear.....	480	131 3	29 0	12 0	Wood.....	4	26	Wilmington, N. C.
Caucus.....	1, 980	200 0	41 0	23 2	do.....	7	28	Montgomery, Ala.
Charleston.....	800	122 6	30 0	12 0	Steel.....	11	60	Portland, Oreg. (2d).
Clatsop.....	1, 360	180 0	38 0	23 0	do.....	7	33	Do.
Comstock.....	1, 100	155 0	35 0	17 0	do.....	3	32	Galveston.
Cumberland.....	1, 905	200 0	41 0	23 6	do.....	6	30	Savannah.
Delaware.....	4, 200	315 0	53 0	22 6	do.....	9	51	Philadelphia.
Galveston.....	3, 375	304 0	51 0	27 0	do.....	6	26	Galveston.
Gedney.....	1, 500	157 0	36 6	16 0	Wood.....	4	19	Newport.
Key West.....	1, 000	142 0	31 7	15 0	do.....	4	22	Jacksonville.
Manhattan.....	4, 000	288 0	47 6	25 0	Steel.....	9	51	Philadelphia.
Meade, Gen. G. G.....	1, 458	177 0	38 0	19 0	do.....	6	30	Grand Rapids.
Michie, Col. P. S.....	1, 528	242 0	43 0	20 0	do.....	6	23	Portland, Oreg. (1st).
Minquas.....	1, 105	147 0	30 0	12 0	do.....	5	20	Wilmington, Del.
Navesink.....	3, 150	290 0	47 6	28 0	do.....	9	54	New York (2d).
New Orleans.....	4, 425	315 0	50 0	26 0	do.....	14	59	New Orleans.
Raritan.....	2, 930	290 0	47 6	28 0	do.....	9	62	New York (2d).
Sabine.....	700	145 0	35 0	12 0	Wood.....	5	12	Dallas.
San Pablo.....	1, 100	163 6	35 0	17 0	Steel.....	7	36	San Francisco (1st).
Savannah.....	1, 461	177 0	38 0	19 0	do.....	6	28	Savannah.
Sumter.....	1, 708	200 0	41 0	22 0	Wood.....	6	34	Charleston.
Winyah Bay.....	831	141 0	31 6	13 6	do.....	4	20	Do.

HYDRAULIC PIPE-LINE DREDGES.

(For operations of these dredges, see Table V, pp. 4029 to 4150, inclusive.)

Apo.....	294	122 0	25 5	5 0	Compos- ite.....	5	13	Rock Island.
Augusta.....	140	74 0	28 0	4 6	Steel.....	2	17	Savannah.
Bacon, Henry.....	1, 410	150 6	39 0	15 0	Wood.....	2	46	Wilmington, N. C.
Barnard.....	1, 291	206 2	38 0	14 0	Steel.....	3	53	Jacksonville.
Beta.....	1, 300	214 0	58 0	6 11	do.....	3	53	St. Louis (M. R. C.).
Blackwater.....	465	110 0	32 0	9 4	Wood.....	4	24	Montgomery.
Catawba.....	886	140 6	40 4	10 7	do.....	4	20	Philadelphia.
Cello.....	64	76 0	22 0	4 4	do.....	1	5	Portland, Oreg. (1st).
Clinton, De Witt.....	383	95 0	27 6	8 6	do.....	8	32	New York (1st).
Congaree.....	430	104 0	32 0	6 0	do.....	2	11	Charleston, S. C.
Creighton.....	221	80 0	30 0	6 0	Steel.....	3	12	Savannah.
Croatan.....	235	80 1	22 6	8 0	Wood.....	5	5	Wilmington, N. C.
Currituck.....	805	150 0	37 0	11 10	Steel.....	9	39	Norfolk.
Dalecarlia.....	233	80 0	26 0	7 6	do.....	1	13	Washington, D. C.
Delatour.....	390	112 0	30 0	5 0	Wood.....	3	37	New Orleans.
Delta.....	830	185 6	38 0	8 4	Steel.....	3	37	St. Louis (M. R. C.).
Epsilon.....	650	162 0	40 0	7 6	do.....	3	37	Do.
Etna.....	280	130 0	28 0	5 0	Compos- ite.....	5	13	Rock Island.
Flad, Henry.....	834	192 0	44 0	7 0	Steel.....	3	40	St. Louis (M. R. C.).
Florida.....	371	152 0	29 9	7 0	do.....	4	17	Jacksonville.
Fort Charles.....	815	197 0	45 0	7 6	do.....	14	42	St. Louis.
Fort Gage.....	815	197 0	45 0	7 6	do.....	14	42	Do.
Gamma.....	581	165 6	38 0	7 10	do.....	3	33	St. Louis (M. R. C.).

1 Double crew.

2 Combination hydraulic and bucket dredge.

TABLE II.—*Alphabetical list, by classes, of floating plant owned by the Engineering Department—Continued.*

HYDRAULIC PIPE-LINE DREDGES—Continued.

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officers.	Men.	
	Tons.	Ft. in.	Ft. in.	Ft. in.				
Geyser.....	141	100 0	24 0	4 5	Compos- ite.	5	14	Rock Island.
Gillespie, Gen. G. L.	880	150 0	37 0	11 10	Steel	7	36	New York (1)
Guadalupe.....	400	188 0	28 0	5 9	Wood	8	12	Galveston.
Gulfport.....	886	150 0	40 0	11 6	Steel	11	31	Mobile.
Hampton.....	91	60 0	23 0	6 0	Wood	2	5	Norfolk.
Harrod, B. M.	1,270	210 0	44 0	8 6	Iron and steel.	3	44	St. Louis (M.)
Hocla.....	217	120 0	26 0	5 0	Wood	5	14	Rock Island.
Houston, Sam.	981	148 0	38 0	12 0	do.	13	44	Galveston.
Humphreys, Chas.	234	129 9	32 0	8 9	do.	5	20	Mobile.
Indiana.....	417	125 0	34 0	6 10	Steel	1	27	Cincinnati (1)
Iota.....	800	192 0	44 0	7 0	do.	3	44	St. Louis (M.)
Kappa.....	834	192 0	44 0	7 0	do.	3	40	Do.
Macon.....	120	74 0	28 0	4 6	do.	2	9	Savannah.
Mallery, Maj. J. C.	666	130 0	32 0	9 0	do.	9	31	Jacksonville.
Mayon.....	309	130 5	28 0	5 5	do.	5	13	Rock Island.
McGregor, Robert.	700	206 9	44 4	7 0	do.	7	54	Little Rock.
Miller, Col. A. M.	710	138 6	37 0	13 0	Wood	5	55	Galveston.
Monticello.....	195	103 3	34 6	5 10	do.	2	9	Portland, Ore.
Morgan.....	667	134 5	34 0	8 0	Steel	6	38	Savannah.
Multnomah.....	1,135	269 4	39 0	9 6	do.	7	41	Portland, Ore.
Muscogee.....	309	120 0	30 0	7 6	Wood	2	6	Montgomery.
No. 6.....	91	90 0	24 0	5 0	Compos- ite.			Mobile.
Orange.....	547	115 0	36 0	9 6	Wood	2	20	Dallas.
Oregon.....	645	120 0	36 0	11 0	do.	3	29	Portland, Ore.
Pascagoula.....	771	150 0	50 0	10 6	Steel	10	30	Mobile.
Pelee.....	250	119 0	30 0	5 0	Wood	4	14	Rock Island.
Pettus.....	488	135 0	35 0	6 6	do.	3	23	Montgomery.
Portland.....	131	100 0	22 0	5 0	Steel	1	9	Louisville.
Pump boat No. 1.	113	90 0	24 0	3 6	Wood		5	Chattanooga.
Ram.....	419	125 0	30 0	7 0	Steel	6	20	New Orleans C. 4th.)
Sacramento.....	984	150 0	40 0	11 6	do.	11	31	San Francisco.
San Bernard.....	440	93 0	32 0	7 6	Wood	8	32	Galveston.
San Jacinto.....	981	148 0	38 0	12 0	do.	7	44	Do.
San Joaquin.....	984	140 0	40 0	11 6	Steel	11	31	San Francisco.
San Pedro.....	834	140 8	40 8	10 7	do.	7	27	Los Angeles.
Sarasota.....	150	77 0	29 6	5 0	do.	2	8	Jacksonville.
Selma.....	600	160 0	40 0	6 0	do.	14	39	St. Louis.
Shippingport.....	131	100 0	22 0	5 0	do.			Louisville.
Taal.....	299	130 0	28 0	5 0	Compos- ite.	5	13	Rock Island.
Taber, H. S.	700	206 9	44 4	7 0	Steel	7	54	Little Rock.
Talbot, Capt. Andrew	465	111 8	32 0	9 7	Wood	6	32	New York (1)
Thebes.....	600	160 0	40 0	6 0	Steel	14	39	St. Louis.
Uncle Sam ¹	450	85 0	34 0	7 0	Wood			Wilmington.
Vesuvius.....	244	114 10	30 0	5 0	do.	4	14	Rock Island.
Wahalak.....	885	150 0	40 0	11 6	Steel	11	31	Mobile.
Wahkiakum.....	1,135	269 4	39 0	9 6	do.	4	41	Portland, Ore.
Warroad.....	280	114 6	27 0	8 6	Wood	2	7	St. Paul.
Waterway.....	417	163 0	34 0	7 0	Steel	5	25	Vicksburg.
Zeta.....	650	162 0	40 0	7 6	do.	3	40	St. Louis (M.)

DIPPER DREDGES.

(For operation of these dredges, see Table VI, pp. 4151 to 4203, inclusive).

Adams, Col. M. B.	417	112 0	34 0	7 3	Steel	1	7	Wheeling.
Addison.....	177	75 0	30 0	7 2	Wood		6	Do.
Ajax.....	124	73 0	26 0	6 0	do.	1	6	Rock Island.
Apache.....	217	80 0	30 0	8 0	do.	1	6	Do.
Appleton.....	214	90 0	32 0	7 0	do.	1	5	Milwaukee.
Asotin.....	200	140 0	28 0	5 0	do.	3	15	Portland, Ore.
Attalla.....	206	75 0	26 4	5 6	do.	2	6	Montgomery.
Carrollton.....	250	86 0	30 0	6 9	Steel		9	Cincinnati (2)
Champoege.....	165	80 0	30 0	5 0	Wood	1	9	Portland, Ore.

¹ Also rigged for bucket dredging.² Laid up at Marcus Hook, Pa.

II.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department—Continued.*

DIPPER DREDGES—Continued.

Number, or Letter.	Dis- place- ment.	Dimensions.			Material.	Comple- ment.		District.
		Length.	Breadth.	Depth.		Offi- cers.	Men.	
	Tons.	Ft. in.	Ft. in.	Ft. in.				
.....	620	155 0	28 0	7 1	Steel.....	2	12	Charleston, S. C.
.....	297	115 6	34 0	6 10	Steel and iron.	1	10	Cincinnati (1st).
.....	348	110 0	40 0	6 0	Steel.....		6	Rock Island.
.....	115	72 0	28 0	5 5	Wood.....		9	Cincinnati (1st).
.....	780	116 0	40 0	11 6	Steel.....	1	10	Duluth.
.....	268	112 0	31 0	4 0	Wood.....		15	Louisville.
.....	280	90 0	34 0	8 0	.....do.....	1	4	Chicago.
.....	326	100 0	34 0	6 10	.....do.....		10	Chattanooga.
.....	348	110 0	40 0	6 0	Steel.....		6	Rock Island.
.....	443	100 0	34 0	9 0	Composite	1	16	Milwaukee.
.....	187	80 0	28 0	6 6	Wood.....		8	Chattanooga.
.....	128	67 0	28 6	6 0	Iron.....	1	8	Louisville.
.....	297	115 6	34 0	6 10	Steel and iron.	1	10	Cincinnati (1st).
.....	549	100 0	36 0	11 0	Wood.....	2	11	Cleveland.
.....	252	85 0	30 0	6 10	.....do.....			Chattanooga.
.....	210	88 8	30 8	6 6	Steel.....	1	7	Louisville.
.....	270	112 0	31 6	6 8	Iron.....	1	10	Cincinnati (1st).
.....	235	94 0	31 6	6 1	.....do.....	1	10	Do.
.....	186	80 0	30 0	8 0	Wood.....	1	5	St. Louis (M. R. C.).
.....	238	80 0	30 6	6 6	.....do.....		7	Wheeling.
.....	375	100 0	35 0	9 2	.....do.....	2	8	Buffalo.
.....	200	80 0	30 0	7 0	.....do.....			Nashville.
.....	348	110 0	40 0	6 0	Steel.....		6	Rock Island.
.....	190	75 0	26 0	7 0	Composite		10	Chattanooga.
.....	375	100 0	34 0	6 10	.....do.....		10	Do.
.....	375	100 0	34 0	6 10	.....do.....		10	Do.
.....	212	85 0	30 0	6 0	Wood.....	2	8	Montgomery.
.....	240	80 0	30 0	8 0	.....do.....	1	5	St. Louis (M. R. C.).
.....	400	100 0	34 0	7 10	.....do.....		10	Chattanooga.
.....	303	85 0	32 0	7 0	.....do.....	2	7	Pittsburgh.
.....	197	86 6	30 0	4 8	.....do.....	2	7	Do.
.....	220	104 7	30 6	5 4	.....do.....	1	7	Little Rock.
.....	159	65 0	26 2	6 5	.....do.....	2	3	Norfolk.

BUCKET DREDGES.

(For operations of these dredges, see Table VII, pp. 4205 to 4234, inclusive.)

.....	400	82 6	32 8	10 4	Wood.....	2	9	Wilmington, N. C.
.....	244	80 0	38 0	6 0	.....do.....		7	Chattanooga.
.....	75	70 0	30 0	4 9	.....do.....	1	6	Montgomery.
.....	302	102 0	36 0	6 1	.....do.....	3	7	New Orleans (M. R. C. 4th).
.....	442	110 0	42 0	7 6	Steel.....	3	12	Do.
.....	341	110 0	40 0	7 4	Wood.....	4	8	Do.
.....	90	70 0	30 0	4 0	.....do.....	1	7	Portland, Oreg. (1st).
.....	163	86 0	28 0	6 5	.....do.....	1	7	Louisville, Ky.
.....	258	80 4	34 3	5 0	.....do.....	3	9	New Orleans.
.....	670	100 0	38 0	11 4	.....do.....	1	11	Wilmington, N. C.
.....	160	70 0	31 4	6 10	.....do.....		9	Cincinnati (2d).
.....	307	106 0	44 0	7 0	.....do.....			St. Paul.
.....	800	100 0	27 0	5 6	.....do.....			Wheeling.
.....	195	103 3	34 6	5 10	.....do.....	2	9	Portland, Oreg. (2d).
.....	150	100 0	30 0	6 0	.....do.....	1	4	Milwaukee.
.....	234	75 0	31 0	6 0	.....do.....	1	9	Do.
.....	176	111 0	22 0	5 0	.....do.....	1	5	Wheeling.
.....	92	83 9	28 0	6 7	.....do.....		4	Grand Rapids.
.....	220	78 0	32 0	7 0	.....do.....	2	8	Wilmington, N. C.
.....	481	100 0	44 0	6 0	.....do.....		10	Chattanooga.
.....	120	92 0	30 0	4 4	.....do.....	2	6	Kansas City, Mo.
.....	244	85 0	28 0	9 4	.....do.....	1	4	New York (1st).
.....	30	80 0	22 0	4 2	.....do.....			Montgomery.

Ladder dredge.

¹ Gravel digging and screening plant.

TABLE II.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department—Continued.*

SNAG BOATS.

(For operations of these snag boats, see Table VIII, pp 4235 to 4268, inclusive.)

Name, number, or letter.	Displacement.	Dimensions.				Material.	Complement.		District.
		Length.	Breadth.	Depth.			Officers.	Men.	
	Tons.	Ft. in.	Ft. in.	Ft. in.					
Arkansas.....	235	155 6	30 0	4 6	Steel.....	3	20	Little Rock.	
Chattahoochee.....	233	140 0	29 0	4 0	Wood.....	3	22	Montgomery.	
Choctawhatchee.....	115	90 0	24 6	3 6	do.....	2	8	Do.	
Columbia.....	137	137 4	27 0	4 0	do.....	3	20	Vicksburg.	
Conecuh.....	37	60 0	30 0	3 0	do.....	1	8	Montgomery.	
Culberson, C. A.....	200	106 0	28 0	5 0	do.....	4	12	Dallas.	
Delatour.....	350	112 0	30 0	5 0	do.....	5	10	New Orleans.	
Demopolis.....	96	82 3	25 7	4 0	do.....	2	11	Mobile.	
Denison.....	265	136 0	32 7	4 6	Steel.....	4	15	Dallas.	
Escambia.....	112	92 0	25 0	4 0	Wood.....	2	8	Montgomery.	
Escatawpa.....	62	60 0	20 0	4 0	do.....	2	11	Mobile.	
Flint.....	127	95 0	24 0	4 0	do.....	3	9	Montgomery.	
Florence, Thos. B.....	107	109 6	20 0	4 0	Iron and steel.	3	9	Vicksburg.	
Ganewa.....	42	64 0	22 6	4 4	Wood.....	2	8	Montgomery.	
Howell, C. W.....	304	166 0	36 0	5 9	Iron and steel.	3	23	Vicksburg.	
Humphreys, Ben.....	286	155 6	32 0	5 0	do.....	3	23	Do.	
Iroquois.....	177	148 2	28 0	4 5	Steel.....	4	15	Cincinnati (1st).	
Johnson, A. B.....	58	84 0	22 0	3 0	Wood.....	1	11	Little Rock.	
Kentucky.....	370	148 0	30 0	5 6	do.....	4	12	Cincinnati (2d).	
Kissimmee.....	65	60 0	18 0	4 0	do.....	2	5	Jacksonville.	
Macomb, J. N.....	1,160	177 6	62 0	8 0	Steel.....	6	36	St. Louis.	
Mammoth Cave.....	284	141 0	32 8	5 0	do.....	3	15	Louisville.	
Mandan.....	150	156 0	24 0	4 7	do.....	3	14	Kansas City.	
Mathloma.....	177	160 0	34 6	5 6	Wood.....	3	11	Portland, Oreg. (2d).	
McCall, R. C.....	133	119 6	28 3	5 0	do.....	4	20	Mobile.	
McPherson, James B.....	340	194 10	36 0	5 7	Steel.....	5	18	Kansas City.	
Missouri.....	510	187 0	52 0	7 0	do.....	6	36	Do.	
Oconee.....	126	110 0	35 0	4 4	Wood.....	3	11	Savannah.	
Ortolo.....	85	107 0	22 4	5 0	do.....			St. Paul.	
Pearl.....	128	96 6	26 0	5 0	do.....	3	11	Mobile.	
Pedee.....	317	131 8	26 0	5 3	Steel.....	2	12	Charleston.	
Pigeon.....	65	60 0	30 6	6 0	Wood.....			New Orleans.	
Quapaw.....	240	147 6	30 0	4 4	Steel.....	3	19	Little Rock.	
Ransdell, Jos. E.....	286	155 6	32 0	5 0	Iron and steel.	3	23	Vicksburg.	
Reese, C. B.....	340	195 9	36 0	5 3	do.....	3	27	Little Rock.	
Riverside.....	87	94 0	22 0	3 0	Wood.....	1	11	Do.	
Rossmore.....	222	115 0	24 0	5 10	do.....	3	5	Norfolk.	
Seizer.....	240	136 6	34 11	4 8	do.....	3	29	San Francisco (3d).	
Swan.....	264	150 0	31 4	4 6	Steel.....	3	11	Pittsburgh.	
Swinomish.....	276	138 0	32 6	5 6	Wood.....			Seattle.	
Tipton, David.....	265	164 0	34 0	5 0	do.....	7	19	Rock Island.	
Tombigbee.....	151	119 0	28 0	5 4	do.....	3	14	Mobile.	
Trant.....	120	70 0	20 0	5 0	do.....	2	8	Wilmington, N. C.	
Trinity.....	190	123 5	30 6	3 0	do.....	4	12	Dallas.	
Tugaloo.....	336	129 3	34 0	5 6	Composite.	3	12	Savannah.	
Twining, Wm. J.....	370	155 0	30 0	4 0	Wood.....	4	15	Montgomery.	
Vienna.....	152	117 6	26 0	4 6	do.....	3	12	Mobile.	
Waco.....	200	118 8	30 2	5 0	do.....	4	12	Dallas.	
Waterloo.....	317	131 8	26 0	5 3	Steel.....	2	12	Charleston.	
Woodruff, E. A.....	863	226 0	48 0	7 6	Iron and steel.	5	25	Cincinnati (1st).	
Wright, Gen. H. G.....	130	89 0	23 6	5 6	Wood.....	2	7	Wilmington, N. C.	
Wright, H. G.....	1,100	187 0	62 0	8 0	Steel.....	6	36	St. Louis.	
York.....	110	72 0	22 0	6 0	Wood.....			Washington, D. C.	
No. 1.....	64	90 0	24 0	2 6	do.....	1	15	Nashville.	
No. 1.....	35	54 0	18 0	4 0	do.....	2	4	Savannah.	
No. 2, derrick barge.....	65	50 0	22 0	7 0	do.....			Galveston.	

* Snag boat and bucket dredge.

II.—Alphabetical list, by classes, of floating plant owned by the Engineer Department—Continued.

DERRICK BOATS.

(For operations of these boats, see Table IX, pp. 4269 to 4315, inclusive).

Number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officers.	Men.	
	Tons.	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>				
	200	140 0	28 0	5 0	Wood			Portland, Oreg. (1st).
	186	72 0	34 0	5 0	Steel	2	3	Washington, D. C.
	35	45 0	20 0	3 9	Wood	1	7	Wilmington, N. C.
	29	46 0	32 0	3 6	do.			Mobile.
	88	65 0	30 0	4 6	do.			Wheeling.
	32	40 0	20 0	4 0	do.		6	Wilmington, N. C.
	140	70 0	26 1	2 8	do.	1	8	Galveston.
	47	50 0	22 0	4 2	do.			Pittsburgh.
	161	115 0	27 0	3 8	do.			Do.
	116	94 0	32 0	5 0	Steel		5	Cincinnati (1st).
	227	120 0	28 0	3 6	Wood			Pittsburgh.
	240	85 0	32 0	7 3	do.	2	11	Philadelphia.
	160	85 4	39 8	5 5	do.	1	11	Savannah.
	81	50 0	40 0	5 0	do.			Mobile.
	300	159 0	34 4	5 1	do.	3	14	Portland, Oreg. (1st).
	110	80 0	28 0	4 0	do.			Charleston.
	50	34 3	13 2	3 0	do.			Chicago.
	107	70 0	32 0	5 0	Steel			Cincinnati (1st).
	185	102 6	32 0	7 10	Wood		1	Cleveland.
	115	65 0	27 0	5 6	do.	3	2	Galveston.
	81	66 6	29 6	5 10	do.		10	Milwaukee.
	142	100 0	30 0	4 9	do.	1	1	New Orleans (M. R. C. 4th).
	78	63 0	24 0	5 0	do.			New Orleans.
	84	74 0	26 0	5 0	do.	2	3	Buffalo.
	51	65 0	28 5	3 10	do.			Portland, Oreg. (1st).
	42	51 0	22 6	2 10	do.			Portland, Oreg. (2d).
	75	68 0	20 0	3 1	do.			St. Louis.
B.	76	70 0	26 0	4 0	do.		2	Louisville.
	86	70 0	26 0	3 8	do.			Pittsburgh.
C.	132	80 0	36 0	5 0	Steel			St. Louis (M. R. C.).
	87	71 0	30 7	4 0	Wood			Pittsburgh.
	131	70 0	32 0	5 0	Steel		3	Louisville.
	107	70 0	32 0	5 0	do.			Cincinnati (1st).
	102	65 0	26 0	5 0	Wood	3	9	Galveston.
	131	84 2	27 4	6 8	do.		2	Milwaukee.
	106	76 0	26 0	6 3	do.	2	3	Buffalo.
	128	100 0	30 0	4 9	do.			New Orleans (4th M. R. C.).
	84	70 0	30 0	4 0	do.	1	9	Portland, Oreg. (1st).
	42	51 0	22 6	2 10	do.			Portland, Oreg. (2d).
	75	68 0	20 0	3 1	do.			St. Louis.
	54	65 0	24 0	3 0	do.	2	18	Vicksburg.
B.	76	70 0	26 0	4 0	do.		5	Louisville.
	70	70 6	26 6	4 0	do.			Pittsburgh.
	131	70 0	32 0	5 0	Steel		3	Louisville.
S. E. D.	113	74 9	34 11	4 1	Wood		1	Wheeling.
	107	70 0	32 0	5 0	Steel			Cincinnati (1st).
	236	50 0	42 0	12 0	do.			Detroit.
	128	100 0	30 0	4 9	Wood	1	1	New Orleans (4th M. R. C.).
	60	75 0	30 0	5 0	do.		5	Memphis (M. R. C. 1st, 2d).
	44	80 0	20 0	4 9	do.			Milwaukee.
	144	80 0	30 0	4 7	do.		2	Nashville.
	42	51 0	22 6	2 10	do.			Portland, Oreg. (2d).
	90	70 7	26 7	4 0	do.			Pittsburgh.
S. E. D.	185	75 0	35 0	4 7	do.		1	Wheeling.
	64	80 0	32 7	3 2	do.			Chattanooga.
	107	70 0	32 0	5 0	Steel			Cincinnati (1st).
	140	70 0	26 1	4 10	Wood			Galveston.
	82	67 5	30 0	4 0	do.			Little Rock.
	19	29 6	10 0	3 10	do.			Los Angeles.
	44	80 0	20 0	4 9	do.			Milwaukee.
	98	70 0	32 0	4 7	do.		2	Nashville.
	42	51 0	22 6	2 10	do.			Portland, Oreg. (2d).
B.	131	70 0	32 0	5 0	Steel		4	Louisville.
	101	70 0	32 0	3 8	Wood			Pittsburgh.

TABLE II.—*Alphabetical list, by classes, of floating plant owned by the Engineering Department—Continued.*

DERRICK BOATS—Continued.

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officers.	Men.	
	Tons.	Ft. in.	Ft. in.	Ft. in.				
No. 5.....	250	100 0	34 0	6 10	Wood		3	Chattanooga
No. 5.....	65	65 0	30 0	4 10	Steel		1	Cincinnati
No. 5.....	19	40 0	18 0	3 6	Wood			Los Angeles
No. 5.....	98	70 0	32 0	4 7	do.			Nashville.
No. 5.....	166	75 6	28 6	7 0	do.			Manila.
No. 5.....	112	90 0	30 0	6 4	do.		3	Portland, O.
No. 5, M. R.	101	70 0	32 0	3 8	do.			Pittsburgh.
No. 6.....	85	80 0	30 0	4 0	do.			Chattanooga
No. 7.....	85	80 0	30 0	3 6	do.		2	Do.
No. 7.....	185	102 6	32 0	7 10	do.			Duluth.
No. 7, L. K.	95	70 0	22 0	4 10	do.			Wheeling.
No. 8.....	80	80 0	30 0	4 0	do.		2	Chattanooga
No. 8.....	40	70 0	20 0	5 7	do.			Duluth.
No. 9.....	104	80 0	30 0	4 9	do.		4	Chattanooga
No. 10.....	140	80 0	30 0	4 0	do.		4	Do.
No. 11.....	90	80 0	30 0	4 0	do.			Chattanooga
No. 12.....	85	80 0	30 0	4 0	do.			Do.
No. 13.....	92	80 0	30 0	4 0	do.		3	Do.
No. 14.....	90	80 0	30 0	4 0	do.			Do.
No. 15.....	134	90 0	34 0	4 0	do.			Do.
No. 16.....	142	90 0	34 0	4 0	do.			Do.
No. 16, Hudson River	170	80 0	26 6	6 0	do.	2	2	New York
No. 18, Hudson River	300	84 0	27 6	8 6	do.		2	Do.
No. 19, Hudson River	170	80 9	27 4	7 6	do.	2	2	Do.
No. 20, Hudson River	145	81 0	27 6	8 6	do.	2	2	Do.
No. 24, U. S. E. D., Wheeling.	161	75 0	35 0	4 10	do.	1	2	Wheeling
No. 29, U. S. E. D., Kanawha.	41	62 0	24 0	3 8	do.			Do.
No. 43, U. S. E. D., Wheeling.	170	75 0	35 0	4 6	do.			Do.
No. 44, U. S. E. D., Wheeling.	160	75 0	35 0	4 6	do.			Do.
No. 116.....	69	69 0	29 0	4 0	do.		20	Vicksburg.
No. 297.....	42	100 0	20 0	4 6	do.	1	4	Rock Island
No. 319.....	65	70 0	26 0	4 0	do.	1	4	Do.
No. 476.....		110 0	24 0	5 0	do.			Do.
No. 503.....	58	66 0	22 0	4 6	do.			Do.
No. 1017.....	74	90 0	32 0	5 0	Crescoted wood.		5	Memphis (1 1st, 2d).
No. 1109.....		96 0	24 0	5 0	Wood.	2	6	Vicksburg (C.).
No. 1311.....		100 0	24 0	5 0	do.	2	6	Do.
No. 1411.....	84	90 0	32 0	5 0	do.		5	Memphis (1 1st, 2d).
No name.....	43	42 11	15 11	3 9	do.		3	Norfolk.
No name.....		76 6	22 0	6 5	do.			Detroit.

PILE DRIVERS.

(For operations of these boats see Table X, pp. 4317 to 4341, inclusive.)

No. 1.....	57	76 0	19 0	4 4	Wood	2	4	Kansas City
No. 1.....	75	80 0	24 0	4 0	do.			Little Rock
No. 1.....	111	66 4	21 4	6 6	do.		2	Milwaukee.
No. 1.....	71	55 0	25 0	4 0	do.			New Orleans
No. 1.....	36	60 0	22 0	8 6	do.		7	Portland, O.
No. 1.....	20	45 3	21 0	3 6	do.			Savannah.
No. 1.....	75	68 0	20 0	3 1	do.		8	St. Louis.
No. 1-B.....	57	76 0	19 0	4 4	do.	2	4	Kansas City
No. 1, M. R.	68	50 0	26 6	4 0	do.			Pittsburgh.
No. 1, O. R.	88	70 0	22 0	4 5	do.	2	27	Louisville.
No. 2.....		80 0	24 0	4 0	do.			Little Rock
No. 2.....	118	60 0	25 4	6 6	do.		2	Milwaukee.
No. 21.....	127	75 6	30 0	5 0	do.			New Orleans
No. 2.....	66	50 0	26 4	4 7	do.		7	Pittsburgh.
No. 2.....	82	70 0	24 0	4 0	do.		8	Portland, O.
No. 2.....	56	76 0	19 0	4 6	do.	2	8	Kansas City
No. 2, O. R.	38	70 0	22 0	4 5	do.		1	Louisville.

1 Piledriver and derrick.

II.—Alphabetical list, by classes, of floating plant owned by the Engineer Department—Continued.

PILE DRIVERS—Continued.

Number, or r.	Dis- place- ment.	Dimensions.			Material.	Comple- ment.		District.
		Length.	Breadth.	Depth.		Offi- cers.	Men.	
	Tons.	Ft. in.	Ft. in.	Ft. in.				
75	68 0	20 0	3 1	Wood	8	8	St. Louis.	
63	76 0	19 0	4 4	do	2	8	Kansas City.	
88	70 0	22 0	4 5	do			Louisville.	
18	40 0	18 0	3 0	do	8	8	Montgomery.	
75	68 0	20 0	3 1	do	8	8	Memphis (M. R. C. 1st, 2d).	
63	76 0	19 0	4 4	do	2	8	Kansas City.	
63	76 0	19 0	4 6	do	2	8	Do.	
12	40 0	18 0	3 0	do		8	Montgomery.	
75	68 0	20 0	3 1	do		8	St. Louis.	
50	50 0	28 0	3 10	do			Cincinnati (2d).	
63	76 0	19 0	4 6	do	2	8	Kansas City.	
57	70 0	20 0	3 0	do		6	Memphis (M. R. C. 1st, 2d).	
65	65 0	19 0	4 6	do		11	Kansas City.	
57	76 0	19 0	4 4	do		4	Do.	
57	76 0	20 0	3 0	do		6	Memphis (M. R. C. 1st, 2d).	
56	60 0	26 0	3 10	do		6	Duluth.	
30	80 0	22 0	4 2	do			Montgomery.	
54	68 0	20 0	3 6	do		1	St. Louis (M. R. C.).	
57	76 0	19 0	4 4	do		4	Kansas City.	
75	68 0	20 0	3 1	do		8	Do.	
75	68 0	20 0	3 1	do		8	St. Louis.	
75	68 0	20 0	3 1	do		8	Do.	
75	68 0	20 0	3 1	do		8	Do.	
75	68 0	20 0	3 1	do		8	Do.	
75	68 0	20 0	3 1	do		8	Do.	
47	66 0	20 0	4 6	do		5	Rock Island.	
75	68 0	20 0	3 1	do		8	St. Louis.	
75	68 0	20 0	3 1	do		8	Kansas City.	
106	88 0	25 0	2 4	Steel	2	6	St. Louis.	
106	88 0	25 0	2 4	do	2	6	Do.	
106	88 0	25 0	2 4	do	2	6	Do.	
106	88 0	25 0	2 4	do	2	6	Do.	
58	66 0	22 0	4 3	Composite		4	Rock Island.	
84	100 0	25 0	5 0	Wood	2	8	Kansas City.	
56	76 0	25 0	3 10	do	1	4	St. Louis (M. R. C.).	
56	76 0	25 0	3 10	do	1	4	Do.	
56	76 0	25 0	3 10	do	1	4	Do.	
56	76 0	25 0	3 10	do	1	4	Do.	
82	60 0	24 0	5 1	do			Wilmington, N. C.	
58	64 0	28 0	3 6	do			San Francisco (3d).	

GRADERS.

(For operations of these graders see Table XI, pp. 4343 to 4352, inclusive.)

280	214 0	30 0	7 7	Wood	20	20	New Orleans (4th M. R. C.).
150	110 0	30 0	5 0	do	11	11	Memphis (M. R. C. 1st, 2d).
280	124 0	30 0	7 7	do	20	20	New Orleans (4th M. R. C.).
126	88 0	25 0	2 4	Steel	2	9	St. Louis.
126	88 0	25 0	2 4	do	2	9	Do.
229	120 0	30 0	6 0	Wood	3	18	Vicksburg (3d M. R. C.).
229	120 0	30 6	6 0	do	3	18	Do.
222	120 0	30 0	6 0	do	3	18	Do.
180	110 0	30 0	6 0	do	11	11	Memphis (M. R. C. 1st, 2d).
190	120 11	30 2	7 0	Steel	11	11	Do.
196	120 11	30 2	7 0	do	1	24	Do.
115	109 4	27 3	4 0	Wood	11	11	Do.
59	70 0	19 10	5 0	do			Kansas City.

¹ Combined grader and derrick boat

TABLE II.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department—Continued.*

DRILL BOATS.

(For operations of these boats see Table XII, pp. 4353 to 4371, inclusive.)

Name, number, or letter.	Displacement.	Dimensions.				Material.	Complement.		District.
		Length.	Breadth.	Depth.			Officers.	Men.	
No. 1.....	Tons. 50	Ft. in. 65 0	Ft. in. 20 0	Ft. in. 3 8	Wood.....				Portland, Oreg. (1st).
No. 1, Columbia River	100	100 0	26 6	4 6	do.....				Seattle.
No. 2.....	45	25 0	6 0	1 0	do.....				Chattanooga.
No. 2.....	50	65 0	20 0	3 8	do.....				Portland, Oreg. (1st).
No. 2, Columbia River	100	100 0	26 6	4 6	do.....				Seattle.
No. 3.....	50	65 0	20 0	3 8	do.....				Portland, Oreg. (1st).
No. 3, Columbia River	100	100 0	26 6	4 6	do.....				Seattle.
No. 6.....	77	80 0	20 0	4 0	do.....				Rock Island.
No. 9.....	10	40 0	14 0	2 8	do.....				Louisville.
No. 10.....	10	40 0	14 0	2 8	do.....			3	Do.
No. 11.....	10	40 0	14 0	2 8	do.....			12	Do.
No. 16.....	60	68 0	26 0	5 0	do.....	1		3	Montgomery.
No. 25, Hudson River	37	34 4	15 6	4 0	do.....	1		4	New York (1st).
No. 39, Hudson River	130	80 0	26 0	3 0	do.....				Do.
No. 46.....	40	80 0	24 0	4 0	do.....				Montgomery.
No. 426.....	272	132 0	32 0	6 0	Steel.....			16	Rock Island.

MANEUVER BOATS.

(For operations of these boats see Table XIII, pp. 4373 to 4387, inclusive.)

No. 1.....	15	45 10	16 0	3 4	Wood.....				Dallas.
No. 1.....	71	73 7	22 5	4 7	do.....		2		Louisville.
No. 1.....	57	60 0	22 0	3 5	do.....				Charleston.
No. 1, A. R.	41	56 0	18 0	3 0	do.....				Pittsburgh.
No. 1, O. R.	70	60 0	22 0	4 0	do.....				Do.
No. 2.....	22	44 1	20 0	3 7	do.....				Dallas.
No. 2.....	71	73 7	22 5	4 7	do.....		6		Louisville.
No. 2, O. R.	70	60 0	22 0	3 8	Steel.....				Pittsburgh.
No. 3, O. R.	54	60 0	20 0	4 0	Wood.....				Do.
No. 4, O. R.	58	60 0	22 0	3 8	do.....				Do.
No. 5, O. R.	65	60 0	22 0	3 8	do.....				Do.
No. 6, O. R.	41	56 0	18 0	3 0	do.....				Do.
No. 7, O. R.	76	60 0	22 0	3 8	Steel.....				Do.
No. 8, O. R.	65	60 0	22 0	3 8	Wood.....				Do.
No. 9, O. R.	76	60 0	22 0	3 8	Steel.....				Do.
No. 10, O. R.	87	60 0	22 0	4 0	do.....				Do.
No. 10, U. S. E. D., Wheeling.	60	60 0	22 0	3 8	Wood.....				Wheeling.
No. 11, U. S. E. D., Wheeling.	60	60 0	22 0	3 8	do.....				Do.
No. 22, U. S. E. D., Wheeling.	60	60 0	22 0	3 8	do.....				Do.
No. 23, U. S. E. D., Wheeling.	60	60 0	22 0	3 8	do.....				Do.
No. 32, U. S. E. D., Wheeling.	74	60 0	22 2	3 8	do.....				Do.
No. 37, U. S. E. D., Wheeling.	82	60 0	22 0	3 8	Steel.....				Do.
No. 38.....	65	65 0	30 0	5 2	Wood.....				Cincinnati (2d).
No. 38, U. S. E. D., Wheeling.	82	60 0	22 0	3 8	Steel.....				Wheeling.
No. 39.....	50	60 0	26 0	3 4	Wood.....				Cincinnati (2d).
No. 39, U. S. E. D., Wheeling.	82	60 0	22 0	3 8	Steel.....				Wheeling.
No. 40, U. S. E. D., Wheeling.	82	60 0	22 0	3 8	do.....				Do.
No. 45.....	75	65 0	30 0	4 10	do.....				Cincinnati (2d).
No. 46.....	55	60 0	26 0	3 6	do.....				Do.
No. 47.....	55	60 0	26 0	3 6	do.....				Do.
No. 56.....	55	60 0	26 0	3 6	do.....				Do.
No. 9113.....	36	60 0	26 0	4 0	Wood.....				Vicksburg.
No. 9122.....	75	80 0	30 0	4 0	do.....				Do.
No. 9123.....	75	80 0	30 0	4 0	do.....				Do.
No. 9127.....	50	60 0	25 0	4 0	do.....				Do.
No name.....	71	75 0	22 9	3 3	do.....				Cincinnati (1st).

TABLE II.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department—Continued.*

TUG AND SURVEY BOATS, SCREW (STEAM).

(For operations of these boats see Table XIV, pp. 4389 to 4434, inclusive.)

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officers.	Men.	
Adams, H. M.	Tons.	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>				
Angler.....	85	75 4	18 9	7 6	Wood.....	2	2	Portland, Oreg. (2d).
Arage.....	85	81 3	17 2	10 0	do.....			Savannah.
Ariadne.....	90	82 6	18 0	9 0	do.....	2	7	Portland, Oreg. (2d).
Boss.....	8	45 6	9 0	4 0	do.....			Milwaukee.
Brewerton.....	85	66 0	16 3	7 0	Iron.....	2	3	Vicksburg (M. R. C. 3d).
Camden.....	60	69 7	15 9	8 11	Wood.....	2	2	Buffalo.
Cassy, Thomas Lincoln.....	170	80 0	20 0	9 0	Steel.....	2	5	Philadelphia.
Castle.....	90	70 0	15 0	8 0	do.....	2	2	Buffalo.
Carwell, Richard.....	165	95 0	20 2	10 6	do.....	2	6	Washington, D. C.
Cerberus.....	200	84 9	18 6	9 4	do.....	2	7	Wilmington, N. C.
Chickasaw.....	226	109 3	23 0	12 6	do.....	4	5	New York (super. of N. Y. Harbor).
Chipeta.....	155	109 0	18 8	9 9	do.....	2	6	Mobile.
Cirele.....	45	76 8	14 10	8 4	Wood.....	2	1	Norfolk.
Coquet.....	39	52 6	14 3	6 6	do.....	2	1	Duluth.
Cynthia.....	100	68 0	18 6	7 0	do.....	2	6	Wilmington, N. C.
Darborne.....	135	74 7	17 10	7 10	do.....	2	6	Do.
Donovan, C.....	9	50 0	8 9	4 9	Steel.....			Chicago.
Engineer.....	180	95 0	19 2	10 0	do.....	2	4	New Orleans.
Esayons.....	298	106 0	20 0	11 0	do.....			Manila.
Gem.....	180	85 0	21 0	11 6	do.....	2	3	Duluth.
Gibbons.....	10	45 2	9 3	4 6	Wood.....			Savannah.
Gillmore, Gen.....	124	61 0	19 9	8 8	do.....	2	11	Do.
Gwendolen.....	47	61 6	15 0	4 10	do.....	2	1	Grand Rapids.
Hancock.....	8	30 0	8 9	4 6	do.....	1	1	Buffalo.
Harding, Horace.....	120	97 10	17 6	7 6	do.....	2	7	Grand Rapids.
Harwood, Col.....	215	90 6	22 1	10 6	do.....	2	6	Mobile.
Inspector, M. R. C. ¹	107	80 0	17 8	9 6	do.....	1	3	Boston.
Lamont.....	110	71 8	16 0	7 10	do.....	4	4	Milwaukee.
Luak, Col. J. L.....	258	144 0	26 0	6 0	Steel.....	3	11	St. Louis (M. R. C.
Lydecker, Gen. G. J.....	216	108 8	22 11	12 6	do.....	4	5	New York (super. of N. Y. harbor).
Maniac.....	295	123 11	19 4	11 10	Wood.....	2	12	Detroit (Lake Survey).
Manissee.....	120	125 0	18 3	10 0	do.....	1	8	Detroit.
Manitowoc.....	113	78 0	17 0	7 0	do.....	2	5	New Orleans (M. R. C. 4th).
Marango.....	225	106 0	22 0	9 0	do.....	4	5	New York (2d).
Mendell, G. H.....	200	100 0	21 6	10 7	Steel.....	4	6	Milwaukee.
Mercur.....	137	82 0	19 4	8 8	do.....	2	5	New Orleans (M. R. C. 4th).
Morgan.....	150	101 0	21 2	10 0	Wood.....	2	7	Portland, Oreg. (2d).
Nimrod.....	60	83 0	13 3	7 0	Steel.....	2	3	Wilmington, N. C.
Noble, Alfred.....	180	94 0	20 4	10 3	do.....	2	5	New Orleans (M. R. C. 4th).
Parker.....	245	106 11	22 8	10 8	Wood.....	4	5	New York (super. of N. Y. Harbor).
Philadelphia.....	83	76 6	15 6	7 0	Steel.....	1	3	Detroit.
Picket.....	98	69 9	16 4	7 2	Wood.....	1	3	Vicksburg (M. R. C. 3d).
Pontiac.....	55	67 0	16 0	7 6	Steel.....	2	5	Philadelphia.
Post, J. C.....	22	52 5	11 11	6 3	Wood.....	1	3	New Orleans.
Quost.....	50	80 0	18 0	3 6	Steel.....	2	2	Washington Bar-racks, D. C.
Ramsay, James.....	95	78 4	18 9	7 6	Wood.....	2	2	Portland, Oreg. (2d).
San Luis.....	46	68 0	15 0	8 0	do.....	2	3	Cleveland.
Sapper.....	29	48 0	12 0	5 0	do.....	1	3	New Orleans.
Search.....	127	120 0	22 0	4 3	Steel.....	1	7	Wheeling.
Serra, Gen. C. B.....	161	121 0	26 0	13 3	do.....			Galveston.
Sentinel.....	100	76 4	16 10	9 6	Wood.....	1	3	Detroit.
Spear.....	195	106 1	20 10	10 8	Steel.....	4	5	New York (super. of N. Y. Harbor).
St. Louis (M. R. C.).....	200	138 10	28 9	4 10	Wood.....	3	10	Detroit (Lake Survey).
Savannah.....	280	110 7	22 0	12 0	Steel.....			Duluth.
Savannah.....	170	95 0	20 0	10 6	do.....	3	6	Baltimore.
Savannah.....	160	87 0	19 8	11 0	Wood.....	2	4	Cleveland.

¹ Twin-screw tunnel boat.

TABLE II.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department—Continued.*

TUG AND SURVEY BOATS, SCREW (STEAM)—Continued.

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officers.	Men.	
Surveyor.....	Tons. 176	<i>Ft. in.</i> 98 0	<i>Ft. in.</i> 20 1	<i>Ft. in.</i> 8 5	Wood....	2	12	Detroit (Lake Survey).
Sydney, C.....	124	73 6	19 0	9 0	do.....	2	3	Savannah.
Talfor, Capt.....	180	80 0	16 2	8 0	do.....	2	5	Galveston.
Thayer, Col.....	34	61 0	16 10	6 10	do.....	2	5	New York (1st).
Ticklaw.....	217	94 0	20 4	10 0	Steel....	2	5	New Orleans (4th M. R. C.).
Tonty.....	120	96 0	16 0	5 6	do.....	2	5	New Orleans.
Totten, Gen.....	35	63 7	17 1	6 11	Wood....	1	4	New York (1st).
Tunica.....	205	90 0	20 4	9 8	Steel....	2	5	New Orleans (4th M. R. C.).
Tuscaloosa.....	212	92 0	23 0	8 0	Wood....	2	6	Mobile.
Uacha.....	43	62 0	13 0	7 5	Iron....	2	3	New Orleans.
Vidette.....	200	105 0	21 0	10 0	Steel....	4	8	Philadelphia.
Vigilant.....	208	114 5	22 8	12 0	do.....	4	7	New York (super of N. Y. Harbor).
Visitor.....	145	95 0	18 0	6 4	do.....	2	5	Cleveland.
West Neeshish.....	47	59 5	12 1	6 6	Wood....	1	2	Detroit.
Whitewater.....	61	83 0	19 0	9 0	Iron....	2	3	Vicksburg (3d M. R. C.).
Wilson.....	106	96 0	19 6	11 0	Steel....	3	9	Seattle.
No. 1, U. S. L. S.....	56	70 1	13 6	6 6	Wood....	2	4	Detroit (Lake Survey).
No. 2, U. S. L. S.....	48	70 3	14 6	7 6	do.....	2	6	Do.

STEAM LIGHTERS.

(For operations of these lighters see Table XV, pp. 4435 to 4438, inclusive.)

Executive.....	236	86 3	20 0	8 5	Wood....	1	3	Boston.
----------------	-----	------	------	-----	----------	---	---	---------

TOW AND SURVEY BOATS, PADDLE (STEAM).

(For operations of these boats see Table XIV, pp. 4439 to 4503, inclusive.)

Ada.....	25	68 0	11 0	3 0	Wood....	2	4	Rock Island.
Alabama.....	219	134 5	25 6	4 4	do.....	4	14	Montgomery.
Alert.....	135	115 0	19 6	3 10	do.....	2	9	Rock Island.
Allen, A. D.....	150	137 10	23 6	4 0	do.....	2	6	Little Rock.
Augustin, Lieut.....	191	136 0	25 6	5 0	Steel....	2	7	Kansas City.
Aux Vasses.....	50	70 0	18 0	3 6	Wood....	1	4	St. Louis.
Bonneville.....	93	127 8	22 9	4 0	do.....	2	7	Kansas City, Mo.
Boone, Daniel.....	86	117 6	22 7	4 0	do.....	2	7	Do.
Cayuga.....	254	163 8	31 1	4 3	Steel....	1	8	Cincinnati (1st).
Chalmette.....	132	105 0	21 0	5 0	Wood....	2	5	New Orleans (4th M. R. C.).
Cherokee.....	278	142 3	27 6	5 1	Steel....	2	7	Louisville.
Chickamauga.....	112	100 0	22 5	3 9	Wood....	1	5	Chattanooga.
Chilhowee.....	104	100 0	19 0	3 6	do.....	1	5	Do.
Chisca.....	450	185 6	30 3	5 0	do.....	4	13	Memphis (M. R. C. 1st, 2d).
Choctaw.....	560	199 4	36 0	5 6	Steel....	2	12	St. Louis (M. R. C.).
Coal Bluff.....	230	128 0	25 0	4 6	do.....	2	9	Rock Island.
Colbert.....	185	158 0	25 6	4 0	do.....	1	9	Chattanooga.
Columbus.....	231	154 0	28 0	4 0	do.....	3	24	Montgomery.
Comanche.....	200	120 0	27 0	5 1	do.....	2	8	Chicago.
Control.....	232	157 0	26 6	4 8	Wood....	4	10	Vicksburg (3d M. R. C.).
Coppee, H. St. L.....	350	166 0	30 0	6 0	Steel....	8	18	Do.
Craighill, Gen.....	198	123 9	28 0	4 3	do.....	2	5	Wheeling.
Crozet.....	54	115 0	19 0	3 0	Wood....	1	3	Do.
E. A. W.....	16	30 0	9 6	2 6	Steel....	1	3	Cincinnati (1st).
Elinor.....	213	125 0	25 0	4 0	Wood....	2	12	Rock Island.
Ellen.....	200	124 0	26 6	4 5	do.....	1	7	Do.
Elsie.....	40	67 0	13 0	3 0	Steel....	2	5	Do.
Emerald.....	28	76 9	14 0	3 3	Wood....	1	3	Louisville.
Emily.....	25	67 0	12 0	3 0	do.....	2	3	Rock Island.

TABLE II.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department—Continued.*

TOW AND SURVEY BOATS, PADDLE (STEAM)—Continued.

Number, or letter.	Displacement.	Dimensions.				Material.	Complement.		District.
		Length.	Breadth.	Depth.			Officers.	Men.	
	Tons.	Ft. in.	Ft. in.	Ft. in.					
John.....	162	136 6	21 0	4 10	Steel.....	3	12	St. Louis (M. R. C.).	
.....	19	66 6	12 3	3 0	Wood.....	2	3	Chicago.	
.....	128	107 9	18 4	5 0	do.....	3	4	Milwaukee.	
.....	110	113 0	22 0	3 10	do.....	2	7	Rock Island.	
.....	38	79 0	17 0	3 11	do.....	2	3	Do.	
.....	138	136 1	27 8	4 0	do.....	3	7	Memphis (M. R. C. 1st, 2d).	
.....	240	131 0	22 0	4 2	do.....	2	6	Cincinnati (2d).	
.....	191	136 0	25 6	5 0	Steel.....	2	7	Kansas City.	
.....	229	157 11	31 7	4 3	Steel and iron.	1	8	Cincinnati (1st).	
.....	34	87 0	18 8	3 2	Wood.....	1	4	Nashville.	
.....	350	163 0	30 0	6 0	Steel.....	8	18	Vicksburg (3d M. R. C.).	
.....	104	100 0	19 0	3 6	Wood.....	1	5	Chattanooga.	
.....	75	102 6	18 0	2 6	do.....	2	6	New Orleans.	
.....	50	70 0	18 0	3 3	do.....	1	4	St. Louis.	
.....	441	145 6	30 0	6 0	Steel.....	8	18	Vicksburg (3d M. R. C.).	
.....	80	94 0	15 0	5 0	Iron.....	2	2	Memphis (M. R. C. 1st, 2d).	
.....	34	87 0	18 8	3 2	Wood.....	1	4	Nashville.	
.....	120	118 0	20 0	4 6	Steel.....	1	4	St. Louis (M. R. C.).	
.....	150	100 0	24 0	4 3	do.....	1	4	St. Louis.	
George G.	94	127 8	22 9	4 0	Wood.....	2	7	Kansas City, Mo.	
W. R.	37	78 7	15 1	3 0	do.....	1	4	Chattanooga.	
M. R.	716	190 0	41 0	5 0	Steel.....	6	26	St. Louis.	
.....	135	118 0	20 0	3 6	do.....	1	5	Pittsburgh, Pa.	
.....	300	136 0	27 10	5 6	do.....	3	9	New Orleans (4th M. R. C.).	
.....	285	125 4	31 0	4 0	do.....	2	9	Rock Island.	
.....	167	137 0	23 0	4 6	Wood.....	2	4	Montgomery.	
.....	550	199 4	36 0	5 6	Steel.....	2	12	St. Louis (M. R. C.).	
.....	191	136 0	25 6	5 0	do.....	2	7	Kansas City, Mo.	
.....	180	136 0	25 0	4 4	Wood.....	1	7	Chattanooga.	
.....	25	61 0	12 8	3 2	Steel.....	2	3	Rock Island.	
.....	35	73 0	16 0	3 3	Wood.....	1	4	Do.	
.....	54	80 0	18 0	3 0	do.....	2	3	Do.	
.....	83	94 6	17 0	3 9	do.....	1	4	Do.	
.....	82	130 6	24 2	4 4	Steel.....	1	6	St. Louis (M. R. C.).	
.....	113	115 0	20 6	3 6	do.....	1	9	Memphis (M. R. C. 1st, 2d).	
.....	150	100 0	24 0	4 3	do.....	1	4	Chattanooga.	
.....	83	94 6	17 0	3 9	do.....	1	6	St. Louis.	
.....	163	131 6	23 0	3 6	Wood.....	1	7	St. Louis (M. R. C.).	
.....	229	157 11	31 7	4 3	Steel and iron.	1	8	Cincinnati (2d).	
.....	285	125 4	31 0	4 0	Steel.....	2	9	Cincinnati (1st).	
.....	480	204 2	29 6	5 4	Wood.....	4	13	Rock Island.	
.....	540	200 11	32 0	6 0	Steel.....	4	36	Memphis (M. R. C. 1st, 2d).	
.....	285	125 4	31 0	4 0	do.....	2	9	St. Louis (M. R. C.).	
.....	285	125 4	31 0	4 0	do.....	2	9	Rock Island.	
Gen. J.	560	175 0	24 0	7 6	do.....	3	9	Do.	
.....	560	199 4	36 0	5 6	do.....	2	12	New Orleans (4th M. R. C.).	
Augustus J.	150	136 0	24 0	5 0	do.....	3	10	St. Louis (M. R. C.).	
.....	191	141 3	24 6	4 3	Wood.....	3	10	Memphis (M. R. C. 1st, 2d).	
.....	120	115 0	22 0	3 0	do.....	2	10	Mobile.	
.....	39	68 8	15 1	3 2	do.....	2	2	Chattanooga.	
.....	264	163 8	31 1	4 3	Steel.....	1	3	Kansas City.	
.....	40	85 1	18 0	4 0	Wood.....	2	4	Cincinnati (1st).	
.....	300	136 0	28 0	5 6	Steel.....	3	9	Chicago.	
.....	150	136 0	24 0	5 0	do.....	3	10	New Orleans (4th M. R. C.).	
M.	206	133 2	22 10	5 0	Wood.....	2	7	Memphis (M. R. C. 1st, 2d).	
T. P.	40	75 0	17 0	2 3	do.....	2	4	Pittsburgh.	
.....	500	199 4	36 0	5 6	Steel.....	2	12	Rock Island.	
.....	150	100 0	24 0	4 3	do.....	1	6	St. Louis (M. R. C.).	

TABLE II.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department—Continued.*

TOW AND SURVEY BOATS, PADDLE (STEAM)—Continued.

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officers.	Men.	
	Tons.	Ft. in.	Ft. in.	Ft. in.				
Satum.....	120	118 0	20 0	4 6	Steel			St. Louis (M. R. C.).
Scioto.....	220	157 11	31 7	4 3	Steel and iron.	1	10	Cincinnati (1st).
Search.....	200	135 3	22 3	4 0	Wood.	3	10	Memphis (M. R. C. 1st, 2d).
Shawnee.....	83	117 0	25 4	3 6	do.	2	5	Louisville.
Simpson, Gen. J. H.	525	170 0	32 0	5 0	do.	6	23	St. Louis.
Blackwater.....	242	137 8	26 10	4 4	do.	2	21	Pittsburgh.
Teche.....	90	100 0	20 4	5 0	Steel.	3	9	New Orleans (4th M. R. C.).
Texas.....	78	93 6	20 4	4 11	do.	2	5	Do.
Vega.....	112	118 6	19 2	4 0	Wood.	1	7	Cincinnati (2d).
Venus.....	83	94 6	17 0	3 9	Steel.	1	6	St. Louis (M. R. C.).
Vulcan.....	83	95 0	17 0	3 9	do.	1	6	Do.
Waroto.....	235	141 0	27 0	5 1	do.	1	5	Nashville.
Wave Rock.....	88	65 10	14 0	2 6	Wood.		4	Louisville.
Wolf.....	114	89 0	19 0	4 6	do.	3	2	Milwaukee.
Woodland.....	75	97 0	24 0	4 6	do.	2	2	Portland, Oreg. (2d).
Wynoka.....	560	199 4	38 0	5 6	Steel.	2	12	Memphis (M. R. C. 1st, 2d).

GASOLINE LAUNCH (SCREW).

(For operation of these launches see Table XVII, pp. 4505 to 4556, inclusive.)

Absecon.....		20 0	6 6	3 0	Wood.....			Wilmington, Del.
Alafia.....	0.65	18 0	5 10	2 5	do.....			Jacksonville, Fla.
Albatross.....	1.7	31 6	7 0	2 10	do.....			Pittsburgh.
Alberita.....		26 0	5 3	1 3	do.....			Rock Island.
Amelia.....		35 0	8 0	3 6	do.....			Savannah.
Amite.....	1.3	20 11	3 11	2 4	do.....			New Orleans.
Ana.....		18 3	4 6	1 4	do.....			Washington, D. C.
Anahuac.....	2	28 0	8 2	3 6	do.....	1		Galveston.
Ariel.....	6	31 0	7 3	4 7	do.....		1	Cleveland.
Arrow.....	2	31 0	7 0	4 0	do.....		2	Montgomery.
Averill.....		36 0	10 6	4 6	do.....	1	1	Washington, D. C.
Bass.....		26 0	5 3	1 3	do.....			Rock Island.
Bastrop.....	16	46 6	11 6	5 0	do.....	1	1	Galveston.
Beatrice.....		30 0	6 6	3 2	do.....			New Orleans (4th M. R. C.).
Beaumont.....	32	58 2	13 7	8 5	do.....	1	2	Dallas.
Beetle.....		26 0	5 1	1 5	do.....			Rock Island.
Bell.....		16 4	4 4	1 8	do.....			Washington, D. C.
Biloxi.....	25	40 0	13 0	4 7	do.....	2	1	Mobile.
Birch.....	1.5	28 0	6 6	2 6	Steel.....			St. Louis.
Bittern.....		26 0	5 3	1 3	do.....			Rock Island.
Black Rock.....	1	25 0	7 3	4 3	do.....		1	Buffalo.
Boeuf.....		14 0	4 5	2 8	Wood.....			New Orleans.
Bolivar.....	.9	25 0	5 0	1 11	do.....		1	St. Louis (M. R. C.).
Bon Homme.....	1.3	21 7	4 11	1 7	do.....		1	Kansas City.
Bonne Femme.....		24 8	5 6	2 5	Steel.....			Do.
Brunswick.....	43.5	60 0	15 0	6 0	do.....	2	1	Savannah.
Bull Calif.....	1	23 0	6 0	3 4	Wood.....		1	St. Paul.
Burton No. 22.....	.9	20 0	4 2	2 3	do.....			Cleveland.
Caddo.....	2.5	30 0	8 0	3 0	do.....			Dallas.
Calcasieu.....	5.6	37 10	10 9	4 0	do.....		1	New Orleans.
Carroll.....	15	51 5	11 5	4 0	do.....	1	1	Vicksburg (3d M. R. C.).
Catoma.....	2	25 0	7 3	2 0	do.....			Montgomery.
Cavallo.....	12	39 10	8 10	5 9	do.....	1	1	Galveston.
Carritos.....	7.3	36 6	9 6	4 9	do.....			Los Angeles.
Chica.....	3.35	19 6	5 5	2 7	do.....			Jacksonville.
Chicago.....	53	75 0	15 6	4 6	do.....		1	Chicago.
Chico.....	.6	20 0	5 0	2 2	Steel.....			Cincinnati (1st).
Chicot.....	4.2	35 5	6 6	3 0	do.....			Vicksburg (3d M. R. C.).
Chipola.....	7	42 0	8 6	7 0	Wood.....		2	Montgomery.
Chippewa.....		35 0	6 0	2 6	do.....		1	Rock Island.
Clermont.....	.9	25 11	6 0	3 0	do.....			Cincinnati (1st).
Clinch.....	3.3	35 0	8 0	3 9	do.....		1	Chattanooga.

TABLE II.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department—Continued.*

GASOLINE LAUNCH (SCREW)—Continued.

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officrs.	Men.	
	Tons.	Ft. in.	Ft. in.	Ft. in.				
Clyde.....	9	42 6	9 3	2 7	Wood			San Francisco (1st).
Cobra.....		26 6	5 3	1 3	do.			Rock Island.
Cockspur.....	1.4	20 0	6 0	2 9	do.			Savannah.
Colonel.....	31	66 8	12 6	5 6	do.	2	2	Galveston.
Comet.....		26 6	5 3	1 3	do.			Rock Island.
Commodore.....	1	23 4	6 0	3 2	do.			Galveston.
Coot.....	1.5	21 0	4 7	2 0	do.			Montgomery.
Coot.....		26 6	5 9	1 8	do.			Rock Island.
Cepano.....	12	28 6	7 0	4 4	do.	1		Galveston.
Cervi.....	2	18 6	4 10	2 4	do.		1	Jacksonville.
Cestoe.....	4	25 6	6 6	2 6	do.			Savannah.
Coyote.....	2	28 6	5 6	3 0	do.			Portland, Oreg. (1st).
Crane.....		20 0	5 9	1 8	do.			Rock Island.
Curlew.....		20 0	5 9	1 8	do.			Do.
Curve.....	2	22 6	5 5	2 7	do.		1	Duluth.
Custodian.....		22 6	6 6	3 0	do.			Wilmington, Del.
D'Armit.....	4.3	35 0	8 3	4 6	do.			Jacksonville.
Dakota.....	2	28 0	5 2	1 3	do.			Rock Island.
Dauphin.....	58.7	89 4	17 1	4 6	do.	2	4	Mobile.
Davy.....		24 8	5 3	1 8	do.			Rock Island.
Dawho.....	26	66 0	13 0	8 0	do.	2	1	Charleston.
Deafield.....	8	39 6	9 6	6 6	do.		1	New York (1st).
Delaware.....	2	20 2	6 8	3 2	do.			Philadelphia.
De Soto.....	14	57 6	10 7	5 1	do.	2	3	Jacksonville.
Dolly.....	2.5	25 2	5 10	2 6	do.			Portland, Oreg. (2d).
Dolly.....		26 0	5 3	1 3	do.			Rock Island.
Don.....	9	41 9	9 7	3 6	do.	1	1	Detroit.
Drift.....		18 0	5 0		do.			New York (2d).
Du Brle.....	1.9	28 6	5 0	3 8	do.		1	Louisville.
Echo River.....	6	40 5	9 6	4 8	do.		1	Do.
Ellis.....	7.5	35 0	9 2	3 1	do.			New London.
Engineer.....	10	37 6	7 8	3 0	do.			Grand Rapids.
Engineer.....	4	30 0	6 6	2 8	do.		1	Washington Bar-
Engineer, U. S.....	6.3	30 0	6 5	2 2	do.		1	rocks, D. C.
Engineer.....		30 4	7 0	3 0	do.			Newport.
Etowah.....	2	25 6	6 6	2 10	do.			Kansas City.
Eudora.....	1	20 0	5 0	1 6	Galv Iron.		1	Montgomery.
Eudora.....	8	27 6	7 3	2 4	Wood			Nashville.
Eureka.....	3	25 0	8 6	3 4	do.			Montgomery.
Faber.....	10	42 0	10 0	4 0	do.		3	Portland, Oreg. (2d).
Fleety.....		26 0	5 1	1 5	do.			Wilmington, N. C.
Folly.....		26 0	5 3	1 3	do.			Rock Island.
Fox.....		26 0	5 3	1 3	do.			Do.
France.....	7	43 0	7 10	3 0	do.		2	Do.
Franklin.....	3	29 0	7 0	3 10	do.			Wilmington, N. C.
Frank.....	2.5	27 0	8 0	3 0	Steel		1	Wilmington, N. C.
"G".....	1.5	25 7	8 2	3 6	Wood	1	1	Vicksburg.
Galena.....		35 0	6 0	2 6	do.			Jacksonville.
Gasawada.....	4	32 0	5 6	2 6	Steel		1	Galveston.
Gannet.....	20	72 0	12 6	5 2	do.	1	3	Rock Island.
Gar.....		26 0	5 3	1 3	Wood			New York (1st).
Gaselle.....	73	66 5	18 2	10 7	do.	1	4	Wilmington, Del.
Gnat.....		26 0	5 1	1 5	do.			Rock Island.
Gnatby.....	1	16 0	4 0	1 3	do.			Newport.
Grey Cloud.....	2	58 0	5 2	1 3	do.		1	Rock Island.
Gull.....		20 0	5 9	1 8	do.			Do.
Hamilton.....		28 0	5 6	1 10	do.			Do.
Hancock No. 2.....	2.5	16 0	5 0	2 4	do.			Grand Rapids.
Harpeth.....	1.75	26 0	6 0	2 2	do.			Nashville.
Hartwick, E. M.....	42	60 0	15 1	7 0	Steel			Galveston.
Helen.....	33	56 0	12 4	5 9	Wood			Do.
Heron.....	11	36 0	9 6	4 5	do.	1	1	Do.
Hawatha.....		35 0	6 0	2 6	do.			Milwaukee.
Hill.....	6.9	31 5	7 7	2 6	do.	1	1	Rock Island.
Hinda.....	1.8	28 0	7 6	4 3	do.		2	Galveston.
Holly.....		26 0	5 3	1 3	do.			Wilmington, Del.
Hornet.....		26 0	5 3	1 3	do.			Rock Island.
Hurricane.....	1.5	24 2	5 4	1 10	do.		1	Do.
Hydrog.....	1	24 10	5 7	1 7	do.		1	Kansas City.
Inalls, Gen.....	8	43 0	8 4	4 9	do.	2		St. Louis (M. R. C.).
								New York (2d).

TABLE II.—*Alphabetical list, by classes, of floating plant owned by the Engineering Department—Continued.*

GASOLINE LAUNCH (SCREW)—Continued.

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officers.	Men.	
	Tons.	Ft. in.	Ft. in.	Ft. in.				
Ino.....	2	27 10	8 4	4 0	Wood.....		1	Dallas.
Inspector.....	6	32 2	6 6	4 7	do.....		1	Cleveland.
Inspector.....	26	50 3	8 9	4 8	Steel.....		2	Detroit (L. vey).
Inspector No. 1.....		25 0	4 6	3 5	do.....		1	Galveston.
Jefferson.....	2	30 7	7 0	5 6	Wood.....			Dallas.
Jennie.....	5	30 0	8 0	3 2	do.....			Portland, O.
Jolly.....		26 0	5 3	1 3	do.....			Rock Island.
Jordan.....	8.5	32 4	9 8	3 2	do.....	1	1	Mobile.
Juanita.....	1	22 0	6 0	2 2	do.....		1	Dallas.
Katharine.....	2	30 5	7 11	3 11	do.....			New London.
Kingfisher.....	19	41 1	11 0	4 0	do.....		2	Milwaukee.
Krey, John.....	7	35 5	8 0	5 0	do.....			Wilmington.
Lad.....		23 0	6 6	2 0	do.....			Detroit.
Lark.....		26 0	5 3	1 3	do.....			Rock Island.
Laura.....	6	40 9	6 7	4 2	Steel.....		2	Louisville.
Lavaca.....	4	26 0	6 1	2 0	Wood.....	1		Galveston.
Leach, Col.....	5.32	36 4	10 6	4 3	do.....			Washington.
Leaf.....	4.5	32 0	7 6	4 0	do.....	1		Mobile.
Liberty.....	2	26 0	7 0	2 10	do.....		1	Dallas.
Locust.....		26 0	5 1	1 5	do.....			Rock Island.
Long, J. C.....	12	42 0	8 5	3 7	Steel.....		2	Do.
Long Point.....	5	38 0	9 6	4 0	Wood.....		2	Norfolk.
Lookout.....	3	30 0	6 6	3 9	do.....			New York.
Loon.....		26 0	6 0	1 6	do.....			N. Y. Har.
Louise.....	13	40 0	10 0	5 0	do.....		1	Rock Island.
Ludington.....	1.47	22 4	5 0	2 4	do.....		1	Charleston.
Luzon.....	12	53 0	9 4	4 9	do.....	1	1	Grand Rapids.
Lydecker, Gen. G. J., No. 1.....		20 6	5 0	2 0	do.....			Pittsburgh.
Lydecker, Gen. G. J., No. 2.....		15 6	4 6	1 9	do.....			Detroit.
Do.....								Do.
Magnire, Capt.....	49	67 0	17 7	4 2	do.....	2	5	Jacksonville.
Mai.....	.95	18 0	5 10	2 5	do.....		1	Do.
Mai Mutat.....		30 6	8 4	3 6	do.....		1	Honolulu.
Mallard.....	8	35 0	9 0	4 2	do.....		1	Milwaukee.
Mamie K.....	2	25 0	6 0	2 7	do.....	1		Mobile.
Mansker.....	.5	20 0	5 0	2 0	do.....		1	Nashville.
Maurepas.....	5.5	36 8	10 8	4 0	do.....		1	New Orleans.
M. C.....		16 0	4 0	1 10	do.....			Chicago.
Meyler, Capt. J. J.....	44	70 6	15 0	7 8	do.....	2	3	Jacksonville.
Mezquite.....	4	30 6	7 4	3 6	do.....	1	1	Galveston.
Mignon.....	.5	18 4	5 2	2 1	Steel.....		1	Cincinnati.
Mifflin.....	49	79 10	11 5	4 0	Wood.....	2	2	Philadelphia.
Millville.....	1	22 6	6 6	2 6	do.....		1	Norfolk.
Minnehaha.....		35 0	6 0	2 6	do.....			Rock Island.
Minneiska.....		35 0	6 0	2 6	do.....		1	Do.
Minquas.....		18 2	6 3	2 11	do.....		1	Wilmington.
Mohawk.....	5.5	35 0	8 6	3 9	do.....		1	Portland, O.
Molly.....		26 0	5 3	1 3	do.....			Rock Island.
Monteau.....	1	24 0	5 0	1 10	do.....		1	Kansas City.
Monomoy.....	62	82 9	15 6	9 6	do.....	2	5	Newport.
Monroe.....	4	40 0	8 6	4 0	do.....		2	Wheeling.
Moreau.....		20 0	5 1	2 1	Steel.....			Kansas City.
Mosquito.....		26 0	5 1	1 5	Wood.....			Rock Island.
Moth.....		26 0	5 1	1 5	do.....			Do.
M. R. C., No. 1.....	.81	19 6	4 10	1 3	do.....		1	St. Louis (M.
M. R. C., No. 2.....	.81	19 6	4 10	1 3	do.....			Do.
Mulberry.....	2.62	35 0	6 10	3 10	do.....	1	1	Mobile.
Munden.....	1	22 6	6 6	2 6	do.....		1	Norfolk.
Murrelet.....	2.5	24 0	6 5	2 6	do.....			Portland, O.
Mustang.....	2.5	20 0	5 2	2 0	do.....	1		Galveston.
Myra.....	10	40 0	7 4	3 6	do.....			Rock Island.
Nancy.....	7.75	30 0	6 5	2 0	do.....		2	Wilmington.
Nanina.....	5	42 4	7 5	3 11	do.....		2	Wheeling.
Nassau.....	1.2	23 10	7 1	3 10	do.....		1	Jacksonville.
Neches.....	1.1	26 0	6 0	2 4	Steel.....		1	Dallas.
Nehalem.....		30 0	8 9	3 6	Wood.....		1	Portland, O.
Nell.....	1.5	25 0	5 6	2 3	do.....			Cincinnati.
Nemadji.....	20	60 9	12 0	6 2	do.....	2	1	Duluth.
Neptune.....	3.3	32 0	5 4	3 6	do.....		1	New Orleans.
								M. R. C.).

TABLE II.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department—Continued.*

GASOLINE LAUNCH (SCREW)—Continued.

Number, or letter.	Dis- place- ment.	Dimensions.			Material.	Comple- ment.		District.
		Length.	Breadth.	Depth.		Offi- cers.	Men.	
		Tons. 10	Ft. in. 37 7	Ft. in. 7 4	Ft. in. 5 6			
	34.6	62 5	15 0	14 3	Wood		2	Detroit (Lake Sur- vey).
	1.5	23 0	7 0	2 8	do.	1	3	Wilmington, N. C.
		30 3	5 8	2 10	do.		1	Philadelphia.
	8.5	35 0	7 6	4 6	do.		1	St. Paul.
	22	62 0	14 0	6 1	do.	1	3	Honolulu.
	6.5	36 10	10 6	4 3	do.		2	Portland, Me.
	6	31 0	8 0	3 0	do.		1	Norfolk, Va.
	.9	25 0	5 0	1 11	do.		1	Galveston.
	2	30 0	5 0	3 0	do.		1	St. Louis (M. R. C.).
	15	41 0	11 6	6 0	do.	2	1	Portland, Ore. (1st).
	5	34 0	8 0	3 2	do.		1	Norfolk.
		27 0	6 3	4 0	do.		1	Wilmington, N. C.
	.2	25 0	6 0	3 2	do.		1	Buffalo.
	37	60 6	12 6	5 3	do.	2	1	Montgomery.
								Memphis (M. R. C. 1st, 2d).
	45	70 6	14 0	3 7	do.	2	2	Seattle.
	1.5	20 0	5 1	3 0	do.		1	Duluth.
	2	28 0	5 2	1 3	do.		1	Rock Island.
	17	65 6	10 5	4 0	Steel	2	2	Vicksburg.
	3	26 6	7 0	5 10	Wood	1		Galveston.
	2	27 9	4 8	2 9	do.		1	Portland, Ore. (1st).
		26 0	5 3	1 3	do.		1	Rock Island.
	10	38 0	9 6	6 5	do.		2	Baltimore.
	6	30 3	8 0	4 0	do.	1		Portland, Ore. (2d).
	65	82 9	15 6	9 6	do.	3	4	Norfolk.
	5	40 0	7 6	4 0	do.		2	Cincinnati (2d).
	2.2	30 0	7 0	3 4	do.		1	Los Angeles.
		26 0	5 3	1 3	do.		1	Rock Island.
	2.5	28 3	7 4	4 6	do.		1	New London.
		26 0	5 3	1 3	do.		1	Rock Island.
		26 0	5 3	1 3	do.		1	Do.
	6	35 0	8 6	4 0	do.		1	Cincinnati (2d).
	2	28 0	5 2	1 3	do.		1	Rock Island.
	19	56 0	9 0	5 0	do.	1	1	Boston.
		20 0	5 9	1 8	do.			Rock Island.
		26 0	5 3	1 3	Steel			Do.
	2	16 0	4 6	2 6	do.		1	Wilmington, N. C.
	6.4	40 2	10 2	4 3	do.	2		Norfolk.
	1.3	18 5	5 0	2 0	Wood			Montgomery.
	2	22 0	7 0	3 0	do.			Savannah.
		35 0	6 0	2 6	do.			Rock Island.
	1	22 6	4 7	1 7	do.		1	Kansas City.
	5.3	30 0	7 6	3 1	Steel			Washington, D. C.
	25	40 9	12 3	5 0	Wood	2	1	Mobile.
	45.5	60 0	16 0	7 0	do.		2	San Francisco (3d).
	1	24 0	4 6	2 0	do.		1	Wilmington, N. C.
	4	22 0	4 0	2 0	Steel			Rock Island.
d Rapids.	5	26 0	7 3	4 0	Wood			Wilmington, N. C.
	2	24 0	4 10	3 4	Steel		1	Vicksburg.
		26 0	6 0	1 8	Wood			Rock Island.
	6.5	35 0	9 0	3 6	do.	1		Portland, Ore. (2d).
		26 0	5 3	1 3	Steel			Rock Island.
	13.8	41 0	9 6	4 0	do.			New Orleans.
	64	70 0	16 0	8 0	do.	1	4	Montgomery.
	65	82 9	15 6	9 6	Wood	2	3	Buffalo.
	16	54 0	12 0	5 3	Steel	2	1	Philadelphia.
	1.2	25 0	5 8	1 10	do.			New York (2d).
		28 0	4 6	2 4	Wood		1	Rock Island.
	8	36 4	10 6	5 10	do.		1	Chicago.
	7.3	40 0	8 0	2 9	do.			Savannah.
	2	27 0	6 0	4 0	Steel		1	Dallas.
		26 0	5 3	1 3	do.			Rock Island.
	4	40 0	8 0	6 0	Wood		4	Montgomery.
	1	24 0	5 0	1 10	do.		1	Kansas City.
	.5	25 0	4 4	3 0	do.			Cincinnati (1st).
	5	32 0	8 0	3 0	do.		1	Jacksonville.
	41	60 0	15 1	7 0	do.	2	1	Norfolk.
		20 0	6 4	2 0	do.			Rock Island.
		20 0	5 10	1 7	do.			Do.
	12.5	45 6	11 0	7 6	do.			Savannah.

TABLE II.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department—Continued.*

GASOLINE LAUNCH (SCREW)—Continued.

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officrs.	Men.	
	Tons.	Ft. in.	Ft. in.	Ft. in.				
Spry.....	2	15 6	5 4	3 8	Wood.....		1	Wilmington, N. C.
Stadia.....	5	30 3	6 5	2 9	do.....			New Orleans.
Starvation.....	1	22 6	6 5	2 6	do.....		1	Norfolk.
Stewart.....	1.5	28 0	6 6	2 6	Steel.....			St. Louis.
Sub Rosa.....		14 0	4 0	2 3	Wood.....			Montgomery.
Sulsun.....	73	85 9	15 6	9 6	do.....	3	2	San Francisco (1st).
Swallow.....		20 0	5 10	1 7	do.....			Rock Island.
Swift.....		20 0	5 10	1 7	do.....			Do.
Tarasoon.....	1.06	26 5	6 1	2 6	Steel.....		1	Louisville.
Tee Ree.....	2	31 0	6 6	2 8	Wood.....	1		Charleston.
Tilly.....		26 0	5 3	1 3	do.....			Rock Island.
Tocool.....	.24	16 10	4 1	1 9	Steel.....			Jacksonville.
Tomahawk.....		22 6	5 6	2 4	Wood.....		1	Kansas City.
Trenton.....	4.5	28 0	8 0	3 8	do.....			Philadelphia.
Trout.....		26 0	5 3	1 3	do.....			Rock Island.
Uchee.....	1.5	24 0	5 11	2 4	Steel.....			Savannah.
Vamos.....	5	31 0	7 0	2 2	Wood.....			Rock Island.
Vernon.....	1	15 0	4 0	2 3	do.....			Montgomery.
Victoria.....	3	27 0	7 0	3 4	do.....	1	1	Galveston.
Vigilant.....	22	63 3	12 0	7 6	do.....	1	1	Portland, Oreg. (2d).
Violetta.....	8	31 0	11 4	4 4	do.....		1	Jacksonville.
Viper.....		28 0	4 6	2 6	do.....			Rock Island.
"W".....		16 4	4 8	0 10	do.....			New York (1st).
Wacouta.....	2	26 0	5 3	1 3	do.....		1	Rock Island.
Wah-ta-wah.....	36	80 0	15 0	5 2	do.....	2	2	New York (1st).
Wakenda.....	1	24 0	5 0	1 10	do.....		1	Kansas City.
Wasp.....		22 0	5 0	0 8	do.....			Rock Island.
Welaka.....	.5	20 0	5 6	2 2	do.....		1	Jacksonville.
Whetstone.....	1.5	24 0	5 6	1 10	do.....		1	Kansas City.
Wild Horse.....	1	24 0	5 0	1 10	do.....		1	Do.
Wolf.....	18	36 8	10 0	3 6	do.....	1	1	Mobile.
Wren.....		26 0	5 3	1 3	do.....			Rock Island.
Zumbro.....		35 0	6 0	2 6	do.....		1	Wilmington, N. C.
No. 1.....		14 0	4 0	2 6	do.....			Wilmington, Del.
No. 1.....	2	17 0	5 5	2 4	do.....			Mobile.
No. 2.....	2	20 0	5 3	3 0	Steel.....		1	Chattanooga.
No. 3.....	3	22 0	6 3	3 2	Wood.....		1	Do.
No. 3, U. S. L. S.....	2.6	22 3	6 3	3 2	do.....			Detroit (Lake Survey).
No. 4.....	6	23 0	6 6	3 6	do.....		1	Chattanooga.
No. 4, M. R. C.....	.81	19 6	4 10	1 3	do.....		1	St. Louis (M. R. C.).
No. 4, U. S. L. S.....	10	38 6	11 0	4 2	do.....			Detroit (Lake Survey).
No. 5, U. S. L. S.....	10	36 1	9 0	6 6	do.....			Do.
No. 6.....	4	23 0	6 0	4 6	do.....		1	Chattanooga.
No. 6, U. S. L. S.....	10	36 0	9 0	4 0	do.....			Detroit (Lake Survey).
No. 7.....	3	27 6	4 0	3 8	do.....		1	Chattanooga.
No. 8, U. S. L. S.....	2.4	23 3	4 6	3 3	do.....			Detroit (Lake Survey).
No. 8.....		23 9	4 10	3 7	do.....			Chattanooga.
No. 33, U. S. E. D., Wheeling.....	.5	22 0	5 10	1 10	do.....			Wheeling, W. Va.
No. 34, U. S. E. D., Wheeling.....	.67	22 0	5 10	1 10	do.....			Do.
No. 36, U. S. E. D., Wheeling.....	.67	22 0	5 10	1 10	do.....			Do.

GASOLINE TOWBOATS (PADDLE).

(For operation of these boats see Table XVIII, pp. 4657 to 4665, inclusive.)

Cornet.....	21	79 0	16 0	2 4	Wood.....		2	Cincinnati (1st).
Cooms.....	123	95 0	18 0	4 9	do.....		6	Montgomery.
Gasconade.....	13	59 2	12 6	2 6	do.....		3	Kansas City.
Glenville.....	30	53 6	9 0	3 0	Steel.....			Wheeling.
Katherine.....	55	86 4	22 0	3 0	Wood.....	2	14	Kansas City.
Kettle Falls.....	18	60 7	11 6	3 7	do.....			Seattle.
Leona.....	10	46 0	10 0	3 0	do.....		2	Rock Island.

TABLE II.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department—Continued.*

GASOLINE TOWBOATS (PADDLE)—Continued.

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officera.	Men.	
	Tons.	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>				
Nista.....	25	70 0	13 0	3 0	Wood.....	.....	3	Chattanooga.
Richland.....	73.7	102 6	20 6	4 7	do.....	.....	.....	Charleston.
Syph.....	23	84 6	16 6	2 9	do.....	1	2	Mobile.
Ukranah.....	40	72 6	16 6	3 6	do.....	.....	3	Do.
White Oak.....	75	104 0	18 0	3 6	do.....	.....	7	Chattanooga.
No. 1.....	52	98 0	15 0	2 8	do.....	.....	2	Nashville.

QUARTER BOATS.

B.....	75	80 4	20 0	6 0	Wood.....	.....	.....	Charleston.
B.....	33	80 0	20 0	3 4	do.....	3	21	Mobile.
Baton Rouge.....	198	140 0	30 4	4 0	do.....	10	180	New Orleans (4th M. R. C.).
Bayou Goula.....	198	140 0	30 4	4 0	do.....	10	180	Do.
Bayou Sara.....	198	140 0	30 4	4 0	do.....	10	180	Do.
Beaufort.....	15	50 0	18 3	2 8	do.....	.....	11	Wilmington, N. C.
C.....	24	68 8	18 0	4 0	do.....	.....	.....	Charleston.
C.....	48	100 0	20 0	4 0	do.....	1	41	Kansas City.
Charter.....	90	80 0	25 0	5 3	do.....	3	15	Philadelphia.
Choupique.....	75	67 8	28 0	4 3	do.....	.....	.....	Savannah.
Donaldsonville.....	157	100 0	30 0	4 0	do.....	12	30	New Orleans (4th M. R. C.).
Hay Lake.....	105	70 0	22 0	4 4	do.....	.....	.....	Detroit.
Intracoastal.....	57.9	65 6	22 6	4 5	do.....	.....	.....	New Orleans.
Lacassine.....	3.4	30 0	15 0	3 5	do.....	.....	.....	Do.
Lake Borgne.....	68	80 0	22 0	4 4	do.....	3	7	New Orleans (4th M. R. C.).
Margaret.....	30	100 0	26 0	4 3	do.....	.....	.....	Chicago.
N.....	65	75 6	22 6	5 2	do.....	.....	21	Mobile.
Natchez.....	198	140 0	30 4	4 0	do.....	10	180	New Orleans (4th M. R. C.).
New Orleans.....	237	108 0	30 0	4 3	do.....	10	180	Do.
O.....	65	75 6	22 6	5 2	do.....	.....	20	Mobile.
Observer.....	25	50 0	20 0	5 0	do.....	.....	1	Philadelphia.
Opa.....	68	80 0	22 0	4 4	do.....	4	8	New Orleans (4th M. R. C.).
Port Hudson.....	68	80 0	22 0	4 4	do.....	2	6	Do.
Pumpo.....	72.7	80 0	22 0	4 3	do.....	5	21	Norfolk.
Q.....	44	70 0	25 0	5 0	do.....	1	20	Mobile.
St. Joseph.....	198	140 0	30 4	4 0	do.....	10	180	New Orleans (4th M. R. C.).
Sunshine.....	12	47 6	11 6	3 0	do.....	.....	8	Wilmington, N. C.
Thremsoska.....	96	75 0	26 0	4 7	do.....	.....	24	Montgomery.
Torre.....	68	80 0	22 0	4 4	do.....	2	6	New Orleans (4th M. R. C.).
Wabash No. 2.....	53	102 4	22 0	3 0	do.....	.....	28	St. Louis (M. R. C.).
Z.....	72	90 0	30 0	4 0	do.....	4	36	Kansas City.
No. 1.....	34	68 8	18 0	4 0	do.....	.....	.....	Charleston.
No. 1.....	28	65 0	14 0	2 6	do.....	.....	10	Nashville.
No. 1.....	20	60 0	16 0	3 0	do.....	.....	4	Chattanooga.
No. 1.....	51	60 8	23 7	7 6	do.....	.....	.....	Galveston.
No. 1.....	110	100 0	20 0	5 0	do.....	10	52	Kansas City.
No. 1.....	104	100 0	20 0	4 0	do.....	.....	60	Little Rock.
No. 1.....	23	50 0	20 0	3 7	do.....	.....	27	Montgomery.
No. 1.....	64	80 2	19 1	4 2	do.....	.....	11	Norfolk.
No. 1.....	27	51 6	11 0	4 0	do.....	.....	.....	Savannah.
No. 1, H. B.....	39.9	45 0	15 0	4 0	do.....	.....	.....	Jacksonville.
No. 1, M. R.....	44	85 0	22 0	3 6	do.....	.....	.....	Pittsburgh.
No. 1.....	120	90 0	26 0	4 0	do.....	.....	11	Portland, Oreg. (2d).
No. 1.....	115	125 0	26 0	3 6	do.....	17	110	St. Louis.
No. 1, Hudson River.....	30	42 0	20 5	3 2	do.....	.....	.....	New York (1st).
No. 1, Neches River.....	27	60 0	16 0	4 0	do.....	.....	10	Dallas.
No. 1, Trinity River.....	24	60 0	22 0	3 0	do.....	10	36	Do.
No. 2.....	40	85 0	18 0	3 0	do.....	.....	48	Chattanooga.
No. 2.....	110	100 0	20 0	5 0	do.....	10	52	Kansas City.
No. 2.....	130	125 0	30 0	3 11	do.....	.....	.....	Memphis (M. R. C. 1st, 2d).
No. 2.....	25	70 0	18 3	3 6	do.....	.....	18	Milwaukee.
No. 2.....	23	50 0	20 0	3 7	do.....	.....	27	Montgomery.
No. 2.....	30	65 0	14 0	2 6	do.....	.....	10	Nashville.

TABLE II.—*Alphabetical list, by classes, of floating plant owned by the Engineering Department—Continued.*

QUARTER BOATS—Continued.

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officers.	Men.	
	Tons.	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>				
No. 2.....	26	56 0	30 0	3 6	Wood.....		10	Portland, O.
No. 2.....	20	82 0	12 0	7 6	do.....			Savannah.
No. 2, Cypress Bayou.	35	66 6	22 0	2 6	do.....		40	Dallas.
No. 2, Ohio.....	88	110 0	22 0	3 6	do.....		44	Louisville.
No. 3.....	24	65 0	16 0	3 0	do.....		2	Chattanooga.
No. 3.....	11	50 0	16 0	3 0	do.....			Chicago.
No. 3.....	110	100 0	20 0	5 0	do.....	10	52	Kansas City.
No. 3.....	26	60 0	16 0	2 0	do.....		8	Montgomery.
No. 3.....	16	60 0	14 0	2 6	do.....		12	Nashville.
No. 3.....	30	56 0	15 4	3 0	do.....			Savannah.
No. 3.....	34	68 0	18 0	3 0	Steel.....	1	20	Vicksburg.
No. 3, Hudson River.	17	40 5	15 6	2 4	Wood.....	3	9	New York.
No. 3, Ohio.....	88	110 0	22 0	3 6	do.....		52	Louisville.
No. 3, Red River.....	25	62 0	18 0	2 10	do.....	1	18	Dallas.
No. 4.....	16	53 0	16 0	2 9	do.....		11	Wilmington.
No. 4.....	48	70 0	21 6	3 0	do.....		50	Montgomery.
No. 4.....	27.7	61 0	18 0	3 2	do.....			Nashville.
No. 4.....	72	90 0	20 0	5 0	do.....	1	41	Kansas City.
No. 4.....	15	51 0	13 0	4 0	do.....			Savannah.
No. 4, Ohio.....	88	110 0	22 0	3 6	do.....			Louisville.
No. 4, Trinity River.	35	66 6	22 0	3 6	do.....		40	Dallas.
No. 5.....	25	64 0	16 0	3 0	do.....		15	Chattanooga.
No. 5.....	130	135 0	30 0	3 11	do.....			Memphis (1st, 2d).
No. 5.....	20	41 0	16 0	3 10	do.....			Savannah.
No. 5.....	72	90 0	20 0	5 0	do.....	1	41	Kansas City.
No. 5.....	34	68 6	18 0	3 0	Steel.....	1	20	Vicksburg.
No. 5, Ohio.....	169	124 6	26 0	4 2	Wood.....	5	5	Louisville.
No. 6.....	20	65 0	16 0	3 0	do.....		24	Chattanooga.
No. 6.....	84	100 0	20 0	5 0	do.....	10	53	Kansas City.
No. 6.....	130	135 0	30 0	3 11	do.....			Memphis (1st, 2d).
No. 6.....	42	60 0	20 0	6 0	do.....			Savannah.
No. 7.....	44	106 0	21 0	3 0	do.....		6	Chattanooga.
No. 7.....	84	100 0	20 0	5 0	do.....	10	88	Kansas City.
No. 7.....	130	135 0	30 0	8 0	do.....	17	116	St. Louis.
No. 8.....	27	67 0	16 0	3 0	do.....		4	Chattanooga.
No. 8.....	84	100 0	20 0	5 0	do.....	10	58	Kansas City.
No. 8.....	125	135 0	31 0	8 0	do.....			Memphis (1st, 2d).
No. 8.....	130	135 0	30 0	3 11	do.....	17	116	St. Louis.
No. 9.....	56	104 0	20 0	3 6	do.....		15	Chattanooga.
No. 9.....	50	100 0	20 0	4 0	do.....	1	41	Kansas City.
No. 9.....	130	135 0	30 0	3 11	do.....	17	116	St. Louis.
No. 9.....	34	68 0	18 0	3 0	Steel.....	1	20	Vicksburg.
No. 10.....	45	105 0	21 0	3 9	Wood.....		36	Chattanooga.
No. 10.....	22	75 0	14 0	1 9	do.....			Cincinnati.
No. 10.....	130	135 0	30 0	3 11	do.....	17	116	St. Louis.
No. 10.....	34	68 0	18 0	3 0	Steel.....	1	20	Vicksburg.
No. 11.....	56	100 0	20 0	4 0	Wood.....		3	Chattanooga.
No. 11.....	40	90 0	18 0	3 6	do.....			Cincinnati.
No. 11.....	125	135 0	31 0	8 0	do.....		128	Memphis (1st, 2d).
No. 11.....	46	75 0	20 0	3 0	do.....		30	Rock Island.
No. 11.....	34	68 0	18 0	3 0	do.....	1	20	Vicksburg.
No. 12.....	125	135 0	31 0	8 0	do.....			Memphis (1st, 2d).
No. 14.....	35	70 0	16 0	4 0	do.....		30	Rock Island.
No. 17.....	52	70 0	24 0	3 0	do.....		84	Do.
No. 20.....	93	100 0	24 0	4 0	do.....			Chattanooga.
No. 21.....	93	100 0	24 0	4 0	do.....			Do.
No. 22.....	95	100 0	24 0	4 6	do.....			Do.
No. 25.....	125	135 0	31 0	8 0	do.....	3	60	Memphis (1st, 2d).
No. 25.....	120	80 0	29 0	5 0	do.....		28	Montgomery.
No. 26.....	125	135 0	31 0	8 0	do.....			Memphis (1st, 2d).
No. 27.....	43	100 4	26 6	4 0	do.....	3	8	Do.
No. 28.....	30	65 0	20 0	3 9	do.....			Wheeling.
No. 29, Amelia.....	43	90 6	18 6	3 0	do.....	11	2	Memphis (1st, 2d).
No. 41, Hudson River	150	86 9	26 4	8 9	do.....			New York.
No. 44, Hudson River	80	62 0	22 0	4 3	do.....			Do.

LE II.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department—Continued.*

QUARTER BOATS—Continued.

Number, or letter.	Dis- place- ment.	Dimensions.			Material.	Comple- ment.		District.
		Length.	Breadth.	Depth.		Offi- cers.	Men.	
	Tons.	Ft. in.	Ft. in.	Ft. in.				
40	50 0	22 0	3 6	Steel				Cincinnati (2d).
46	75 0	20 0	3 0	Wood		35		Rock Island.
32	58 0	18 0	3 6	do.		18		Do.
20	40 0	16 0	2 0	do.		6		Do.
46	75 0	20 0	3 6	do.		6		Do.
46	75 0	20 0	3 6	do.		35		Do.
15	50 0	12 0	3 0	do.		12		Do.
40	81 0	16 0	3 0	do.		20		Do.
43	70 0	20 0	3 0	do.		48		Do.
14	40 0	14 0	2 0	do.		3		Do.
26	52 0	16 0	2 6	do.		12		Do.
26	52 0	16 0	2 6	do.		12		Do.
26	52 0	16 0	2 6	do.		12		Do.
186	131 0	30 0	5 0	do.		131		Vicksburg (M. R. C. 3d).
107	120 0	28 0	6 0	do.	8	90		Do.
107	120 0	28 0	6 0	do.		12		Do.
107	120 0	28 0	6 0	do.	8	94		Do.
107	120 0	28 0	6 0	do.				Do.
62	100 0	20 0	3 0	do.		56		Rock Island.
33	60 0	18 0	3 0	do.		18		Do.
43	70 0	20 0	3 0	do.		35		Do.
130	120 0	30 0	6 0	do.		120		Memphis (M. R. C. 1st, 2d).
130	120 0	30 0	6 0	do.		120		Do.
62	100 0	20 0	4 3	do.		56		Rock Island.
62	100 0	20 0	4 3	do.		20		Do.
46	68 0	22 0	3 0	do.		24		Do.
45	66 0	22 0	3 0	do.		18		Do.
46	75 0	20 0	4 0	do.		35		Do.
50	80 0	20 0	3 0	do.		20		Do.
43	70 0	20 0	3 0	do.		46		Do.
43	70 0	20 0	3 0	do.		30		Do.
43	70 0	20 0	3 0	do.		30		Do.
50	80 0	20 0	3 0	do.		20		Do.
50	80 0	20 0	3 0	do.		20		Do.
50	80 0	20 0	3 0	do.		20		Do.
50	78 0	26 0	3 0	do.		60		Do.
60	76 0	26 0	4 0	do.		50		Do.
51	82 0	20 0	3 0	do.		46		Do.
43	70 0	20 0	3 0	do.		30		Do.
50	71 0	18 0	3 6	do.		30		Do.
100	100 0	20 0	5 0	do.				Kansas City.
40	75 0	20 0	3 0	do.		30		Rock Island.
40	75 0	20 0	3 0	do.		30		Do.
42	80 0	18 0	3 6	do.		20		Do.
42	80 0	18 0	3 6	do.		20		Do.
42	80 0	18 0	3 6	do.		20		Do.
30	68 0	18 0	4 0	do.	5	14		Do.
177	135 0	34 0	5 0	do.	8	127		Memphis (M. R. C. 1st, 2d).
156	140 0	30 0	4 0	do.		156		Vicksburg (M. R. C. 3d).
156	140 0	30 0	4 0	do.		156		Memphis (M. R. C. 1st, 2d).
177	140 0	34 0	5 0	do.		129		Do.
177	140 0	34 0	5 0	do.		129		Vicksburg (M. R. C. 3d).
177	140 0	34 0	5 0	do.		129		Do.
77	100 0	26 0	4 0	do.	3	33		Do.
177	140 0	34 0	5 0	do.	10	144		Memphis (M. R. C. 1st, 2d).
177	140 0	34 0	5 0	do.	10	144		Vicksburg (M. R. C. 3d).
190	160 0	36 6	4 0	do.	2	255		Do.
77.8	86 0	22 0	4 9	do.				Memphis (M. R. C. 1st, 2d).
41.2	62 6	18 0	3 6	do.				Vicksburg (M. R. C. 3d).
								Do.

TABLE II.—*Alphabetical list, by classes, of floating plant owned by the Engineer Department—Continued.*

CONCRETE-MIXING PLANTS.

(For operations of the mixers, see Table XXII, pp. 4069 to 4097, inclusive.)

Name, number, or letter.	Displacement.	Dimensions.			Material.	Complement.		District.
		Length.	Breadth.	Depth.		Officers.	Men.	
No. 1.....	Tons. 308.1	Ft. in. 30 0	Ft. in. 26 0	Ft. in. 7 0	Wood.....	.....	.....	Cincinnati (1st).
No. 1.....	146	90 0	30 0	6 4	do.....	.....	16	Portland, Oreg. (2d).
No. 1, Paver.....	290	124 0	30 0	7 7	do.....	2	5	New Orleans (4th M. R. C.).
No. 17, Hudson River	150	90 0	27 0	7 0	do.....	6	9	New York (1st)
No. 63, U. S. E. D., Wheeling.	480	90 0	40 0	7 1	do.....	.....	13	Wheeling.
No. 1208.....	400	120 11	45 2	7 0	Steel.....	1	11	Memphis (M. R. C. 1st, 2d).
No. 1508.....	200	120 0	30 0	7 0	Wood.....	.....	12	Vicksburg (M. R. C. 3d).
No. 672.....	280	120 0	30 0	6 0	do.....	.....	12	Do.
No. 063.....	180	120 0	30 0	6 0	do.....	2	12	Do.
No. 066.....	180	120 0	30 0	6 0	do.....	2	12	Do.

TABLE III.

LIST OF FLOATING PLANT, BY DISTRICTS.

3847

TABLE III.—Statement of floating plant owned by the United States

BALTIMORE, MD.

Name or number.	Type.	Displacement	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
		Long tons.	Ft. in.	Ft. in.	Ft. in.		Where.
Sentinel.....	Tugboat, screw.....	170.00	95 0	20 0	10 6	1897	Baltimore, Md.
Pathfinder.....	Gasoline boat, screw.....	10.00	38 0	9 6	6 5	1909	Fort Howard,

BOSTON, MASS.

Col. Harwood ¹	Tug and survey boat.....	107.00	80 0	17 8	9 6	1908	South Portland
Executive.....	Steam lighter.....	238.00	91 0	20 0	10 0	1901	Essex, Mass.
Plebe.....	Gasoline launch (screw).....	19.00	56 0	9 0	5 0	1899	Boston, Mass.
No. 1.....	Survey boat (screw).....	18.00	55 0	12 0	3 2	1910	.....do.....
No. 2.....	.....do.....	18.00	55 0	12 0	3 2	1910	.....do.....
No. 3.....	.....do.....	18.00	55 0	12 0	3 2	1911	Chelsea, Mass.
No. 4.....	.....do.....	18.00	55 0	12 0	3 2	1911	.....do.....
No. 1.....	Float, boring.....	8.00	30 0	12 6	3 3	1913	East Boston, Mass.
No. 2.....	.....do.....	8.00	30 0	12 6	3 3	1913	.....do.....

BUFFALO, N. Y.

Scajaquada.....	Gasoline cruiser.....	65.00	82 9	15 6	9 6	1914	Muskegon, Mich.
Casey, Thomas Lincoln ²	Steam tug.....	90.00	70 0	16 0	8 0	1898	Toledo, Ohio.
Brewerton.....	.....do.....	60.00	65 7	15 9	8 9	1893	Benton Harbor, Mich.
Gwendolen.....	Steam launch.....	8.00	31 6	8 0	4 6	1900	Erie, Pa.
Black Rock.....	Gasoline launch.....	1.00	25 0	7 3	4 0	1911	Buffalo, N. Y.
Ontario.....	.....do.....	1.00	27 0	6 3	4 0	1904	Oswego, N. Y.
Sodus.....	Dipper dredge.....	375.00	100 0	35 0	9 8	1912	.....do.....
No. 1.....	Derrick scow.....	85.00	74 0	26 0	5 0	1902	.....do.....
No. 2.....	.....do.....	106.00	76 0	26 0	6 3	1905	.....do.....
No. 3.....	Material scow.....	.....	68 0	20 0	5 6	1905	.....do.....
No. 4.....	.....do.....	.....	68 0	20 0	5 6	1905	.....do.....
No. 5.....	.....do.....	.....	42 0	12 6	3 11	1908	.....do.....
No. 6.....	.....do.....	.....	68 0	20 0	5 6	1907	.....do.....
No. 7.....	Dump scow.....	.....	75 0	20 0	6 6	1907	.....do.....
No. 8.....	.....do.....	.....	75 0	20 0	6 6	1907	.....do.....
No. 13.....	Stone scow.....	150.00	100 0	32 0	9 5	1909	.....do.....
No. 14.....	Material scow.....	.....	70 0	22 0	6 5	1911	.....do.....
No. 15.....	Dump scow.....	.....	100 0	24 0	8 2	1912	.....do.....
No. 16.....	.....do.....	.....	100 0	24 0	8 2	1912	.....do.....
No. 17.....	Sounding raft.....	.....	60 0	20 0	2 0	1915	Buffalo, N. Y.

CHARLESTON, S. C.

Sumter ³	Seagoing hopper dredge.....	1,706.22	200 0	41 0	21 0	1904	Petersburg, Va.
Winyah Bay ⁴.....	.....do.....	831.00	141 0	31 6	13 0	1898	Wilmington, N. C.
Congaree ⁵	Hydraulic pipe-line dredge.....	430.00	104 0	32 0	6 0	1907-1908	Georgetown, S. C.

¹ Formerly Mina and Lizzie.² After purchase this boat was altered and repaired to such extent that its original cost in its state was about \$14,000.³ Built by United States by contract.⁴ Rebuilt by United States, 1904.

FLOATING PLANT.

3849

employed in the Engineer Department at large on Dec. 31, 1916.

BALTIMORE, MD.

When.	Purchased.		First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
	Where.	Material.					
1897	Baltimore, Md.	Steel	\$24,497.00	\$15,000.00	Good	\$513.91	Improving Harbor at Baltimore, Md.
.....	Built by U. S.	Wood	1,360.00	750.00	do	1.05	Do.

BOSTON, MASS.

1905	Portland, Me.	Wood	\$7,500.00	\$4,500.00	Good	.....	Boston Harbor, Mass.
(*)	do.	do.	19,450.00	6,000.00	do	\$1,965.24	Gun and mortar batteries.
(*)	do.	do.	5,980.00	750.00	do	122.17	Boston Harbor one-half, Plymouth Harbor and Mystic River one-fourth each.
(*)	do.	do.	1,349.00	600.00	do	.....	Boston Harbor, Mass.
(*)	do.	do.	1,249.00	600.00	do	.....	Do.
(*)	do.	do.	1,237.50	600.00	do	.....	Do.
(*)	do.	do.	1,237.50	600.00	do	.....	Do.
(*)	do.	do.	2,575.00	750.00	do ^a	.....	Merrimack River, Mass.
(*)	do.	do.	2,575.00	750.00	do ^b	.....	Do.

BUFFALO, N. Y.

.....	.....	Wood	\$30,000.00	\$25,000.00	Good	\$806.94	Erle Harbor, Pa., Black Rock, Oswego and Ogdensburg Harbors, N. Y.
.....	.....	Steel	11,970.00	7,000.00	do	1,529.90	Buffalo Harbor, N. Y.
1909	Bay City, Mich.	Wood	2,950.00	7,000.00	do	1,342.04	Harbors on Lake Ontario.
.....	do.	do.	1,800.00	1,000.00	do	80.20	Erle Harbor, Pa.
1911	Buffalo, N. Y.	do	600.00	375.00	do	115.19	Black Rock Harbor, N. Y.
.....	do.	do.	525.00	625.00	do	89.06	Harbors on Lake Ontario.
.....	do.	do.	36,000.00	36,000.00	do	4,909.68	Do.
.....	do.	do.	2,000.00	1,450.00	do	372.19	Charlotte Harbor, N. Y.
.....	do.	do.	5,000.00	2,450.00	Fair	404.84	Little Sodus Harbor, N. Y.
.....	do.	do.	1,250.00	850.00	do	194.00	Charlotte Harbor, N. Y.
.....	do.	do.	1,250.00	850.00	do	152.43	Do.
.....	do.	do.	450.00	450.00	Good	.....	Oswego Harbor, N. Y.
.....	do.	do.	1,500.00	950.00	do	.....	Little Sodus Harbor, N. Y.
.....	do.	do.	3,100.00	300.00	Poor	.....	Harbors on Lake Ontario.
.....	do.	do.	3,100.00	300.00	do	.....	Do.
.....	do.	do.	6,500.00	4,500.00	Good	.....	Do.
.....	do.	do.	2,273.25	1,650.00	do	542.24	Charlotte Harbor, N. Y.
.....	do.	do.	5,621.87	5,000.00	do	.....	Harbors on Lake Ontario.
.....	do.	do.	5,621.37	5,000.00	do	.....	Do.
.....	do.	do.	999.93	800.00	do	.....	Buffalo Harbor and Black Rock Harbor, N. Y.

CHARLESTON, S. C.

.....	.....	Wood	\$191,560.00	\$75,000.00	Good	\$6,399.30	Improving Harbor at Charleston, S. C.
.....	do.	do.	73,800.00	35,000.00	Fair	115.25	Improving Winyah Bay, S. C.
.....	.....	Steel	30,200.00	50,000.00	Good	1,214.96	Improving Santee, Wateree, Congaree, and Great Pee Dee Rivers, S. C.

^a Dismantled and stored at Fort Standish, Boston Harbor, Mass.

^b Formerly "Gen. John M. Wilson."

^c Built under contract.

^d Rebuilt under contract.

TABLE III.—Statement of floating plant owned by the United States Army.

CHARLESTON, S. C.—Continued.

Name or number.	Type.	Displacement.	Dimensions.				Built.	Where.
			Length.	Beam.	Depth.	Whse.		
		Long tons.	Ft. in.	Ft. in.	Ft. in.			
Charaw ¹	Dipper dredge	600.00	155 0	28 0	8 0	1905		Wilmington, N. C.
Pedee ²	Snag boat	317.00	131 8	27 0	5 3	1912-1913		Charleston, S. C.
Waterce ²	do	317.00	131 8	27 0	5 3	1912-1913		do
No. 1 ²	Derrick boat	110.00	80 0	28 0	4 0	1907		Columbia, S. C.
No. 2 ²	do	149.00	70 0	23 0	6 10	1911		Georgetown, S. C.
No. 3 ²	do	95.00	60 0	20 0	6 0	1911		do
No. 1 ²	Maneuver boat	56.80	60 0	22 0	3 5	1911-1912		Columbia, S. C.
Dawho	Gasoline launch (screw)	20.00	60 0	13 0	8 0	1909		City Island, N. C.
Louise ¹	do	13.00	41 0	11 0	4 8	1909		Mt. Pleasant, S. C.
Tee-See	do	2.00	31 0	6 6	2 4	1907		do
Granby ⁴	do	1.00	16 0	4 0	1 3	(⁵)		Unknown
Richland ²	Gasoline towboat (paddle)	78.70	108 6	20 6	4 7	1912-1913		Columbia, S. C.
B ²	Quarter boat	75.60	60 4	20 0	6 0	1908		Charleston, S. C.
C ²	do	34.00	68 8	18 0	4 0	1914-1915		Columbia, S. C.
No. 1	115 cubic yard bottom-dump scow	112.00	69 3	21 5	6 6	(⁵)		Unknown
No. 2	130 cubic yard bottom-dump scow	125.00	71 4	22 2	7 8	(⁵)		do
No. 1	100-ton decked lighter	100.00	72 6	20 0	6 0	1907		Charleston, S. C.
No. 2	75-ton decked lighter	75.00	60 6	19 6	6 0	1908		do
No. 3	15-ton decked lighter	18.00	41 0	12 0	4 0	1908		Georgetown, S. C.
No. 4 ²	70-ton decked lighter	70.00	78 0	22 0	4 0	1908		Columbia, S. C.
No. 5 ¹⁰	30-ton decked lighter	30.00	40 0	14 8	3 0	1908		do
No. 6	2-ton decked lighter	2.00	20 0	5 0	1 2	1906		do
No. 7	6-ton open-boring flat	6.00	20 0	10 0	2 0	1915		Charleston, S. C.
No. 8	60-ton decked lighter	12.00	55 0	18 0	4 0	1916		Columbia, S. C.
No. 9	3.5-ton decked lighter	1.25	20 0	6 6	1 10	1916		do

CHATTANOOGA, TENN.

Chickamauga	Stern wheel towboat	112.00	115 0	22 6	3 0	1915		Muscle Shoals
Chilhowee	do	104.00	113 0	20 0	3 6	1906		do
Colbert	do	186.00	129 6	28 3	4 3	1921		do
Hwassee	do	135.00	115 5	22 11	3 10	1908		do
Col. W. R. King	do	37.00	78 0	15 8	3 6	1906		Muscle Shoals
Lookout	do	180.00	137 8	25 7	4 4	1906		do
McPherson	do	137.00	115 0	22 6	3 6	1906		do
Ogee	do	120.00	115 0	22 6	3 0	1914		Muscle Shoals
White Oak	Gasoline towboat	96.00	115 0	23 6	3 6	1905		Jeffersonville, Tenn.
Clinch	Gasoline launch	9.50	35 0	8 0	3 9	1912		Colbert Shoals
No. 2	do	2.00	21 7	5 7	2 9			do
No. 3	do	3.00	22 8	6 5	3 3	1908		Knoxville, Tenn.

¹ Built under contract.² Built by United States.³ Formerly derrick "A."⁴ Formerly listed as bucket dredge.⁵ Formerly derrick boat No. 1 (snag boat).

NOTE.—Niota burned during June, 1916.

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

CHARLESTON, S. C.—Continued.

When.	Purchased.		First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
	Where.	Material.					
		Steel.	\$45,500.00	\$30,000.00	Fair...	\$750.63	Improving Great Peedee River, S. C.
		do.	29,295.45	19,500.00	Good...	805.17	Do.
		do.	29,375.12	19,000.00	do.	1,162.13	Improving Santee, Wateree, and Congaree Rivers, S. C.
		Wood.	5,988.22	2,450.00	Fair...	65.46	Improving Congaree River, S. C.
		do.	6,477.00	2,000.00	Poor...		Improving Santee, Wateree and Congaree Rivers, S. C.
		do.	4,206.00	1,500.00	do.		Improving Great Peedee River, S. C.
		do.	5,409.00	4,000.00	Good...	30.90	Operating and care of canals, etc., for Congaree River, S. C.
1910	Rochester, N. Y.	do.	3,000.00	7,080.00	do.	411.77	All works in district.
		do.	3,500.00	2,000.00	do.	31.29	Do.
1914	Charleston, S. C.	do.	315.00	215.00	do.	20.00	Improving Santee, Wateree and Congaree Rivers, S. C.
		do.	125.00	75.00	Fair...	37.56	Do.
		do.	10,277.28	8,200.00	Good...	235.20	Improving Congaree River, S. C., and operating and care of canals, etc.
		do.	800.00	100.00	Poor...		Improving Waccamaw River, N. C. and S. C.
		do.	1,554.86	1,250.00	Good...		Improving Santee, Wateree and Congaree Rivers, S. C.
1913	Jacksonville, Fla.	do.	2,586.94	1,500.00	Fair...		Improving Winyah Bay, S. C.
1913	do.	do.	2,259.90	1,500.00	do.		Do.
		do.	1,047.00	450.00	do.		Fortification works.
		do.	800.00	150.00	do.		Do.
		do.	200.00	50.00	Poor...		Do.
		do.	900.00	350.00	Fair...		Do.
		do.	400.00	125.00	do.		Do.
		do.	125.00	75.00	do.		Improving Congaree River, S. C.
		do.	60.00	50.00	do.		Improving Ashley River, S. C.

CHATTANOOGA, TENN.

		Wood.	\$19,955.38	\$13,437.00	Good...	\$467.30	Tennessee River.
1908	Jeffersonville, Ind.	do.	" 9,616.92	5,808.00	Fair...	528.87	Do.
1891	do.	do.	" 9,500.00	16,064.00	Good...	1,333.34	Do.
1908	do.	do.	" 9,616.92	4,122.00	Fair...	2,419.56	Do.
		do.	" 1,300.00	1,248.00	do.	1,539.59	Do.
1896	do.	do.	" 9,000.00	6,756.00	Poor...	4,522.65	Do.
1898	Nashville, Tenn.	do.	" 3,300.00	6,444.00	Fair...	2,854.83	Do.
		do.	" 18,453.00	12,653.00	Good...	1,716.69	Do.
1908	Decatur, Ala.	do.	" 2,500.00	5,909.00	Fair...	895.42	Do.
		do.	" 1,662.00	915.00	do.	277.68	Colbert Shoals Canal.
1897	Detroit, Mich.	Steel.	525.00	369.00	do.	3.95	Tennessee River.
		Wood.	738.35	258.00	do.	3.85	Do.

* Unknown.

† Formerly No. 3.

‡ Formerly No. 1.

* Formerly D.

† Formerly E.

‡ Rebuilt by the United States.

TABLE III.—Statement of floating plant owned by the United States and

CHATTANOOGA, TENN.—Continued.

Name or number.	Type.	Displacement.	Dimensions.				Built.	Where.
			Length.	Beam.	Depth.	When.		
		Long tons.	Ft. in.	Ft. in.	Ft. in.			
No. 4.....	Gasoline launch.....	6.00	23 0	6 6	3 3	1906	Knoxville, Tenn.....	
No. 6.....	do.....	4.00	28 4	5 0	2 6	1909	Muscle Shoals Canal.....	
No. 7.....	do.....	1.50	22 0	5 0	2 9	1908	do.....	
No. 8.....	do.....	1.92	23 9	4 10	2 5			
Alabama.....	Dredge (wet conveyor).....	244.00	98 6	38 0	6 4	1891	Chattanooga, Tenn.....	
Kentucky.....	Dipper dredge.....	326.00	109 0	34 0	6 10	1900	Paducah, Ky.....	
Kwasind.....	do.....	187.00	80 0	28 0	6 6	1899	Knoxville, Tenn.....	
Nollechucky.....	do.....	211.00	97 11	30 0	6 9	1913	Muscle Shoals Canal.....	
Tellico.....	do.....	170.00	85 3	30 0	7 0	1912	Knoxville, Tenn.....	
Tennessee.....	do.....	390.00	109 2	34 0	6 10	1910	Muscle Shoals Canal.....	
Tishomingo.....	Dredge (bucket).....	481.00	107 0	44 0	5 5	1912	do.....	
Tusculum.....	Dipper dredge.....	375.00	109 0	34 0	6 10	1912	do.....	
Watsuga.....	do.....	400.00	105 0	34 0	7 10	1912	do.....	
Pu mp boat 1.....	10-inch suction.....	113.00	60 6	24 0	4 4	1910	Muscle Shoals Canal.....	
No ¹ 1.....	Quarter boat.....	26.00	60 0	16 0	3 2	1893	Kington, Tenn.....	
No ² 2.....	do.....	37.00	85 0	18 0	3 0	1896	do.....	
No ³ 3.....	do.....	13.60	66 3	16 4	3 6	1888	Chattanooga, Tenn.....	
No ⁴ 4.....	do.....	33.60	64 0	20 0	3 3	1902	Knoxville, Tenn.....	
No ⁵ 5.....	do.....	22.00	64 0	16 0	3 2	1902	do.....	
No ⁶ 6.....	do.....	65.00	106 0	21 0	3 0	1902	do.....	
No ⁷ 7.....	do.....	24.00	68 8	16 0	3 2	1893	Chattanooga, Tenn.....	
No ⁸ 8.....	do.....	56.00	100 0	20 0	3 0	1907	Muscle Shoals Canal.....	
No ⁹ 9.....	do.....	112.00	105 0	21 0	3 4	1908	do.....	
No ¹⁰ 10.....	do.....	56.00	100 0	20 0	3 0	1908	do.....	
No ¹¹ 11.....	do.....	93.00	100 0	24 0	4 6	1913	New Orleans, La.....	
No ¹² 12.....	do.....	100.00	100 0	24 0	4 2	1913	do.....	
No ¹³ 13.....	do.....	95.00	100 0	24 0	4 6	1914	Chattanooga, Tenn.....	
No ¹⁴ 14.....	Derrick boat.....	64.00	80 0	32 7	3 2	1896	Knoxville, Tenn.....	
No ¹⁵ 15.....	do.....	160.00	90 5	34 0	4 0	1908	Muscle Shoals Canal.....	
No ¹⁶ 16.....	do.....	76.00	80 0	30 0	4 0	1906	Knoxville, Tenn.....	
No ¹⁷ 17.....	do.....	85.00	80 6	30 0	4 6	1909	Muscle Shoals Canal.....	
No ¹⁸ 18.....	do.....	115.00	80 6	30 0	4 6	1915	Chattanooga, Tenn.....	
No ¹⁹ 19.....	do.....	100.00	80 0	30 0	4 9	1912	Colbert Shoals Canal.....	
No ²⁰ 20.....	do.....	140.00	80 5	30 0	4 0	1913	Sheffield, Ala.....	
No ²¹ 21.....	do.....	80.00	81 4	30 0	4 0	1913	New Orleans, La.....	
No ²² 22.....	do.....	85.00	81 4	30 0	4 0	1913	do.....	
No ²³ 23.....	do.....	124.00	80 6	30 6	4 6	1913	Chattanooga, Tenn.....	
No ²⁴ 24.....	do.....	83.00	80 0	30 0	4 0	1913	do.....	
No ²⁵ 25.....	do.....	134.00	90 0	34 0	4 0	1914	New Orleans, La.....	
No ²⁶ 26.....	do.....	160.00	91 2	34 0	4 0	1914	do.....	
No ²⁷ 27.....	Tool boat.....	37.00	60 0	16 0	3 4	1902	Knoxville, Tenn.....	
No ²⁸ 28.....	do.....	15.00	64 0	16 0	2 10	1893	do.....	
No ²⁹ 29.....	Drill tender.....	150.00	80 5	30 0	4 0	1912	Sheffield, Ala.....	
No ³⁰ 30.....	do.....	1.31	81 1	30 6	4 6	1913	Muscle Shoals Canal.....	
No ³¹ 31.....	do.....	117.00	80 6	30 6	4 6	1913	Chattanooga, Tenn.....	
No ³² 32.....	Drill boat.....	18.70	40 7	14 5	3 0	1913	Muscle Shoals Canal.....	
Nos. 13 and 14.....	Drill rafts.....	30.00	32 4	78 8	1 2	1913	Sheffield, Ala.....	
No ³³ 33.....	do.....	36.00	30 0	14 0	0 10	1908	Knoxville, Tenn.....	
No ³⁴ 34.....	do.....	12.00	30 0	14 0	0 10	1916	Hazleridge Shoals.....	
No ³⁵ 35.....	do.....	31 8	17 8			1916	Williams Shoals.....	
No ³⁶ 36.....	do.....	31 8	17 8			1916	do.....	
No ³⁷ 37.....	do.....	31 8	17 8			1916	do.....	
No ³⁸ 38.....	do.....	12.00	30 6	14 0	0 10	1916	Chattanooga, Tenn.....	
No ³⁹ 39.....	do.....	12.00	30 0	14 0	0 10	1916	do.....	
No ⁴⁰ 40.....	do.....	12.00	30 0	14 0	0 10	1916	do.....	
No ⁴¹ 41.....	do.....	22.60	70 0	30 0	1 8	1916	Coulter Island Shoals.....	
No ⁴² 42.....	do.....	30.00	32 4	78 8	1 2	1915	Kogers Island Shoals.....	
No. 22.....	215-ton barge.....	41.50	100 0	24 0	5 0	1905	Muscle Shoals Canal.....	
No. 25-R.....	225-ton barge.....	45.30	100 0	24 0	5 0	1915	Chattanooga, Tenn.....	
No. 26.....	221-ton barge.....	57.50	100 6	24 6	4 10	1906	Muscle Shoals Canal.....	
No. 26-R.....	225-ton barge.....	45.30	100 0	24 0	5 0	1915	Chattanooga, Tenn.....	
No. 28.....	106-ton barge.....	51.00	100 0	20 0	3 0	1908	Knoxville, Tenn.....	
No. 31.....	120-ton barge.....	45.00	50 2	24 6	5 3	1908	Muscle Shoals Canal.....	
No. 34.....	250-ton barge.....	75.00	120 0	24 2	5 4	1908	do.....	
No. 35.....	112-ton barge.....	31.00	50 0	24 8	5 0	1911	do.....	
No. 36.....	120-ton barge.....	45.00	50 0	24 6	5 3	1912	do.....	
No. 37.....	50-ton barge.....	20.00	70 0	16 6	3 8	1908	do.....	
No. 40.....	112-ton barge.....	45.00	50 0	24 8	5 0	1910	do.....	
No. 41.....	300-ton barge.....	103.00	120 0	24 2	6 0	1912	do.....	

¹ Rebuilt by United States.

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

CHATTANOOGA, TENN—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and re-building during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	738.35		Wrthls.	\$11.00	Tennessee River.
		do.	832.76	53.00	Fair.	67.00	Do.
		do.	805.57	405.00	Good.	320.23	Do.
1914	Riverton, Ala.	do.	200.00	130.00	Poor.		Colbert Shoals Canal.
		do.	122,500.00	12,201.00	Good.	50.33	Muscle Shoals Canal.
		do.	134,500.00	16,065.00	do.	2,704.86	Tennessee River.
		do.	11,000.00	16,521.50	Poor.	3,165.38	Do.
		do.	27,011.65	16,673.50	Fair.	3,374.67	Do.
1912		do.	17,978.00	6,663.00	Poor.	2,251.63	Do.
		do.	37,513.00	14,850.00	do.	4,765.67	Do.
		do.	37,068.00	17,207.00	do.	2,204.48	Do.
		do.	43,870.92	20,517.00	Fair.	4,977.81	Do.
		do.	49,327.16	23,412.00	Poor.	1,969.44	Do.
		do.	7,000.00	3,462.00	Fair.	119.30	Do.
		do.	1,000.00	926.00	do.		Do.
		do.	800.00	19.00	Poor.	24.45	Do.
		do.	700.00	1,319.00	Good.	1,212.00	Do.
		do.	935.00	142.00	Poor.		Do.
		do.	935.00	470.00	Fair.		Do.
		do.	1,800.00	1,563.00	Good.	747.35	Do.
		do.	850.00	572.00	Fair.	7.50	Do.
		do.	2,437.00	742.00	Poor.	45.00	Do.
		do.	3,257.00	2,954.00	Good.	1,255.00	Do.
		do.	2,750.00	1,679.00	Fair.	50.80	Do.
		do.	5,337.00	3,632.00	Good.	17.98	Do.
		do.	8,143.63	6,162.00	do.	70.75	Do.
		do.	8,503.53	5,935.00	do.	20.45	Do.
		do.	3,325.00	849.00	Poor.	329.88	Do.
		do.	3,946.00	4,393.00	Good.	1,224.15	Do.
		do.	3,624.00	3,884.00	Fair.	662.79	Do.
		do.	5,407.00	4,330.00	Good.	1,392.94	Do.
		do.	6,401.72	5,004.00	Fair.	1,645.99	Do.
		do.	6,703.00	3,032.00	Poor.	228.34	Colbert Shoals Canal.
		do.	5,556.14	3,578.00	Good.	1,140.18	Tennessee River.
		do.	8,293.22	6,223.00	Fair.	338.00	Do.
		do.	8,627.13	5,537.00	do.	369.67	Do.
		do.	8,627.13	6,160.00	do.	615.59	Do.
		do.	7,871.43	5,941.00	Good.	607.38	Do.
		do.	9,295.02	6,762.00	Fair.	775.60	Do.
		do.	9,002.05	8,053.00	do.	1,117.60	Do.
		do.	660.00	525.00	do.		Do.
		do.	600.00	60.00	do.		Do.
		do.	5,885.72	3,554.00	Good.	337.00	Do.
		do.	6,833.78	4,310.00	Fair.	302.73	Do.
		do.	6,969.06	4,802.00	Poor.	84.24	Do.
		do.	2,670.13	1,865.00	Good.		Do.
		do.	1,640.00	465.00	Fair.	560.87	Do.
		do.	225.00		Wrthls.		Do.
		do.	156.00		do.		Do.
		do.	197.29	164.00	Fair.		Do.
		do.	199.68	166.00	do.		Do.
		do.	199.67	166.00	do.		Do.
		do.	168.08	156.88	Good.		Do.
		do.	168.08	156.88	do.		Do.
		do.	168.08	156.88	do.		Do.
		do.	1,094.76	1,058.27	do.		Do.
		do.	968.07	677.00	do.	345.12	Do.
		do.	2,314.31	1,134.50	Good.	119.88	Do.
		do.	2,504.86	2,100.00	do.		Do.
		do.	2,103.01		Wrthls.		Do.
		do.	2,212.62	1,890.00	Good.	5.25	Do.
		do.	1,049.65		Poor.		Do.
		do.	1,177.29	751.00	Fair.		Do.
		do.	2,756.14	2,153.00	do.		Do.
		do.	1,614.63	496.00	do.		Do.
		do.	2,000.11	875.00	do.	138.42	Do.
		do.	950.62	283.00	do.	283.00	Do.
		do.	1,352.32	212.00	do.	97.75	Do.
		do.	4,208.95	1,839.00	do.	58.36	Do.

* Being rebuilt by United States.

TABLE III.—Statement of floating plant owned by the United States.

CHATTANOOGA, TENN.—Continued.

Name or number.	Type.	Dis- placement.	Dimensions.				Built.	
			Length.	Beam.	Depth.	Wharf.		
			Long tons.	Ft. in.	Ft. in.	Ft. in.		
No. 42.	32-ton barge.		17.41	60	0	12	0 3 2 1911	Knoxville, T.
No. 43.	do.		17.41	60	0	12	0 3 2 1911	do.
No. 44.	160-ton barge.		34.00	80	0	20	6 4 9 1912	Riverton, A.
No. 45.	do.		34.00	80	0	20	6 4 9 1912	do.
No. 46.	125-ton barge.		45.00	80	5	20	5 4 0 1912	Sheffield, A.
No. 47.	do.		45.00	80	5	20	5 4 0 1912	do.
No. 52.	100-ton barge.		25.00	80	0	20	6 4 0 1912	Knoxville, T.
No. 53.	do.		25.00	80	0	20	6 4 0 1912	do.
No. 54.	112-ton barge.		28.00	80	8	20	4 4 6 1912	Muscle Shoals
No. 55.	do.		28.00	80	8	20	4 4 6 1912	do.
No. 56.	31-ton barge.		11.00	60	0	14	10 2 4 1914	do.
No. 57.	112-ton barge.		54.00	80	0	20	0 4 6 1908	Knoxville, T.
No. 58.	80-ton barge.		47.00	80	0	20	0 4 6 1913	New Orleans
No. 59.	do.		47.00	80	0	20	0 4 6 1913	do.
No. 60.	112-ton barge.		54.00	80	0	20	0 4 6 1913	do.
No. 61.	do.		54.00	80	0	20	0 4 6 1913	do.
No. 62 ¹ .	300-ton barge.		89.00	120	6	32	8 5 0 1913	do.
No. 63 ¹ .	do.		89.00	120	6	34	0 5 0 1913	do.
No. 64.	112-ton barge.		33.00	80	0	20	0 4 6 1913	do.
No. 65.	125-ton barge.		45.00	80	0	20	0 4 6 1913	do.
No. 66.	100-ton barge.		63.94	80	6	20	6 4 6 1913	Chattanooga
No. 67.	do.		25.00	80	0	20	6 4 0 1913	do.
No. 68.	60-ton barge.		25.00	60	3	18	0 3 7 1913	Knoxville, T.
No. 69.	do.		25.00	60	3	18	0 3 7 1913	do.
No. 72.	112-ton barge.		32.00	80	0	20	0 4 6 1913	New Orleans
No. 73.	do.		47.00	80	0	20	0 4 6 1913	do.
No. 74.	do.		54.00	80	0	20	0 4 6 1913	do.
No. 75.	do.		54.00	80	0	20	0 4 6 1913	do.
No. 76.	do.		47.00	80	0	20	0 4 6 1913	do.
No. 77.	do.		54.00	80	0	20	0 4 6 1913	do.
No. 78.	do.		32.00	80	0	20	0 4 6 1913	do.
No. 79.	do.		54.00	80	0	20	0 4 6 1913	do.
No. 80.	300-ton barge.		95.00	119	9	24	0 6 6 1913	do.
No. 81.	205-ton barge.		67.00	100	8	24	5 5 0 1914	Kegons Island
No. 82.	do.		67.00	100	5	24	5 5 0 1915	Smithsonia,
No. 84.	41-ton barge.		19.97	71	0	15	0 3 5	
No. 86.	222-ton barge.		44.00	100	0	24	6 4 11 1916	Chattanooga.
No. 4-R.	75 cubic yard dump scow		82.00	73	0	20	0 6 0 1915	do.
No. 5.	do.		82.00	73	0	20	0 6 0 1909	Muscle Shoals
No. 6.	do.		82.00	73	0	20	0 6 0 1909	do.
No. 6-R.	do.		82.00	73	0	20	0 6 0 1915	Chattanooga
No. 7.	do.		82.00	73	0	20	0 6 0 1909	Muscle Shoals
No. 8.	do.		82.00	73	0	20	0 6 0 1910	do.
No. 9.	do.		82.00	73	0	20	0 6 0 1911	do.
No. 10.	do.		82.00	73	0	20	0 6 0 1911	do.
No. 11.	do.		82.00	73	0	20	0 6 0 1911	do.
No. 12.	do.		82.00	73	0	20	0 6 0 1911	do.
No. 13.	do.		82.00	73	0	20	0 6 0 1912	do.
No. 14.	do.		82.00	73	0	20	0 6 0 1912	Knoxville, T.
No. 14-R.	do.		82.00	73	0	20	0 6 0 1915	Chattanooga
No. 15.	do.		82.00	73	0	20	0 6 0 1912	Knoxville, T.
No. 16.	do.		82.00	73	0	20	0 6 0 1912	Muscle Shoals
No. 17.	do.		82.00	73	0	20	0 6 0 1913	Chattanooga

CHICAGO, ILL.

Illinois.	Dipper dredge.	280.00	98	0	34	0	8	0	1914	Peoria, Ill.
Comanche.	Towboat.	200.00	120	0	27	0	5	4	1915	Dubuque, Ia.
Fox.	do.	17.00	80	2	12	3	3	0	1897	Keokuk, Iowa.
Pearl.	do.	40.00	100	1	18	0	4	1	1909	Beardstown, Ill.
Dearborn.	Steam launch.	9.00	50	0	8	6	3	2	1903	Racine, Wis.
Chicago.	Gasoline launch.	53.00	75	4	15	6	9	3	1916	Milwaukee, Wis.

¹ Being rebuilt by United States.² Barge 62 equipped with machinery for carpenter shop.

FLOATING PLANT.

8855

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

CHATTANOOGA, TENN.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood	\$466.00	\$130.00	Poor	6.00	Tennessee River.
		do.	466.00	133.00	do.	6.36	Do.
		do.	2,933.87	2,750.00	Fair	1,660.89	Colbert Shoals Canal.
		do.	2,933.87	1,093.34	Poor	27.30	Do.
		do.	1,941.28	701.00	do.	375.95	Tennessee River.
		do.	1,941.28	721.00	do.	740.90	Do.
		do.	1,762.23	763.00	Fair	145.80	Do.
		do.	1,715.68	752.00	do.	129.35	Do.
		do.	2,262.03	876.00	do.	452.12	Do.
		do.	2,262.03	875.00	do.	471.60	Do.
		do.	595.53	373.00	Good	.....	Muscle Shoals Canal.
		do.	1,417.35	721.00	Fair	401.57	Tennessee River.
		do.	2,157.59	1,123.00	Poor	184.10	Do.
		do.	2,157.29	1,123.00	do.	198.46	Do.
		do.	2,157.29	1,122.00	Good	.....	Do.
		do.	2,157.29	1,122.00	do.	.....	Do.
		do.	4,046.78	2,391.00	do.	125.72	Do.
		do.	4,045.78	3,938.00	Fair	753.64	Do.
		do.	2,157.29	1,123.00	do.	.....	Do.
		do.	2,157.29	1,122.00	do.	.....	Do.
		do.	1,734.63	966.00	do.	.....	Do.
		do.	1,739.30	980.00	do.	.....	Do.
		do.	1,079.43	534.00	Poor	46.30	Do.
		do.	1,103.74	553.00	do.	41.49	Do.
		do.	2,147.24	1,364.00	Fair	.....	Do.
		do.	2,147.24	1,366.00	Poor	131.10	Do.
		do.	2,147.24	1,365.00	do.	.....	Do.
		do.	2,147.24	1,365.00	do.	246.03	Do.
		do.	2,147.24	1,366.00	do.	.....	Do.
		do.	2,147.24	1,365.00	do.	.....	Do.
		do.	2,159.75	1,372.00	Fair	.....	Do.
		do.	2,159.75	1,372.00	do.	.....	Do.
		do.	4,664.73	2,964.00	do.	.....	Do.
		do.	3,598.58	2,681.00	Good	.....	Do.
		do.	3,457.56	2,647.00	do.	.....	Do.
1915	Knoxville, Tenn.	do.	350.00	449.00	Fair	.....	Do.
		do.	2,606.68	2,562.00	Good	94.58	Do.
		do.	2,712.37	1,695.00	Fair	270.17	Do.
		do.	2,666.95	2,039.00	Poor	610.00	Do.
		do.	2,666.95	.....	Wrtis.	438.25	Do.
		do.	2,627.76	1,835.00	Poor	.....	Do.
		do.	2,216.07	2,147.00	do.	755.06	Do.
		do.	2,949.39	913.00	do.	215.46	Do.
		do.	2,626.99	109.00	Fair	.....	Do.
		do.	2,626.99	109.00	do.	889.86	Do.
		do.	2,626.99	545.00	Poor	781.27	Do.
		do.	2,626.99	545.00	do.	736.70	Do.
		do.	3,441.73	861.00	Fair	627.50	Do.
		do.	2,920.31	365.00	Poor	145.62	Do.
		do.	2,632.47	1,995.00	Fair	162.75	Do.
		do.	2,723.87	385.00	Poor	279.31	Do.
		do.	3,708.44	952.00	do.	824.09	Do.
		do.	3,007.51	1,004.00	Fair	.....	Do.

CHICAGO, ILL.

		Wood	\$33,660.26	\$30,378.00	Good	\$1,115.50	Illinois River, Ill.
		Steel	34,806.00	33,250.00	do.	327.95	Do.
		Wood	4,385.00	400.00	Unserviceable.	97.50	Do.
		do.	7,000.00	6,218.50	Good	485.30	Do.
1902	Racine, Wis.	Steel	5,000.00	2,500.00	do.	53.45	Chicago River, Ill.
1916	Milwaukee, Wis.	Wood	19,990.00	20,000.00	do.	.....	Chicago Dist. works except Illinois River.

* Barge 63 equipped with machinery for machine shop and blacksmith shop and ice plant.

* Rebuilt by United States.

TABLE III.—Statement of floating plant owned by the United

CHICAGO, ILL.—Continued.

Name or number.	Type.	Dis- place- ment.	Dimensions.			When.	Built
			Length.	Beam.	Depth.		
		<i>Long tons.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>		
Seminole.....	75 cubic yard dump scow.	8.00	36 4	10 6	5 10	1913	Racine, W.
La Salle.....	Power skiff.....	1.00	22 0	4 6	1 3	1915	Peoria, Ill.
M. C.....	do.....		16 0	4 0	1 10	1909	Michigan
None 1.....	Quarter boat.....	48.00	100 0	20 0	4 0	(1878 1897)	Peoria, Ill. Kampsvi built.
Margaret.....	do.....	130.00	100 0	26 0	4 3	1893	Gasconad
No. 3.....	do.....	11.00	50 0	16 0	3 6	1893	Peoria, Ill.
No. 6.....	150-ton barge.....	48.00	100 0	20 0	4 6	1904	Beardsto
No. 7.....	do.....	48.00	100 0	20 0	4 0	1905	do.....
No. 8.....	do.....	35.00	80 0	20 0	5 0	1911	Peoria, Ill.
No. 9.....	50-ton barge.....	24.00	60 0	16 0	4 2	1913	do.....
No. 12.....	80 cubic yard dump scow	39.00	70 0	18 0	5 3	1907	Beardsto
No. 13.....	do.....	33.00	70 0	18 0	5 3	1903	do.....
No. 14.....	100 cubic yard dump scow.	45.00	78 8	20 0	5 9	1915	Peoria, Ill.
No. 15.....	do.....	45.00	78 8	20 0	5 9	1915	do.....
No. 1.....	Derrick scow.....	50.00	34 3	13 2	3 0	1913	Michiga
No. 1.....	Deck scow.....	100.00	40 2	17 2	3 7	1914	do.....
No. 1.....	Survey scow.....	50.00	55 0	12 0	3 2	1916	Michigan

CINCINNATI, OHIO, FIRST DISTRICT.

Indiana.....	Hydraulic pipe-line dredge.	417.50	125 0	34 0	6 10	1908	Jefferson
Ohio.....	Dipper dredge.....	270.00	112 0	31 6	6 8	1880	St. Louis
Oswego.....	do.....	235.00	94 0	31 6	6 1	1883	do.....
Cincinnati.....	do.....	297.00	115 6	34 0	6 10	1915	Jefferson
Marietta.....	do.....	297.00	115 6	34 0	6 10	1915	Dubuque
Woodruff, E. A.....	Side-wheel snag boat....	863.00	226 0	48 4	7 6	(1874 1876)	Newport, Pittsburg
Iroquois.....	Stern-wheel snag boat....	176.80	148 2	28 6	4 0	1912	Dubuque
E. A. W.....	Stern-wheel steam launch.	16.00	30 0	9 6	2 6	1901	New Alb
Nell.....	Gasoline launch.....	1.50	25 0	5 9	2 8	1893	Glouceste
Mignon.....	do.....	.50	18 4	5 2	2 1	1910	Salem, O
Chico.....	do.....	.60	20 0	5 0	2 2	.....	.....
Clermont.....	do.....	.90	25 9	6 0	3 0	(*)	New RI Ohio.
Sisters, Tho.....	do.....	.50	25 0	4 4	3 0	1911	Golconda
Miami.....	Stern-wheel towboat.....	229.00	157 11	31 1	4 3	1912	Cincinnati
Guyandot.....	do.....	229.00	157 11	31 1	4 3	1912	do.....
Scioto.....	do.....	229.00	157 11	31 1	4 3	1912	do.....
Cayuga.....	do.....	254.30	163 8	31 1	4 3	1916	do.....
Ottawa.....	do.....	254.30	163 8	31 1	4 3	1916	do.....
Comet.....	Stern-wheel towboat (gas).	21.00	69 0	16 0	2 4	.....	.....
Mingo.....	Derrick boat.....	116.30	94 0	32 0	5 0	1912	Dubuque
No. 1.....	do.....	107.10	70 0	32 0	5 0	1914	Jefferson
No. 2.....	do.....	107.10	70 0	32 0	5 0	1914	do.....
No. 3.....	do.....	107.10	70 0	32 0	5 0	1915	do.....
No. 4.....	do.....	107.10	70 0	32 0	5 0	1915	do.....
No name.....	Maneuver boat.....	71.00	75 0	22 0	3 3	1910	Elizabeth
No. 1.....	Pump boat.....	151.20	100 0	30 0	5 2	1911	Levana,
No. 1.....	Concrete mixing plant...	208.10	80 0	36 0	7 0	1915	Dam No River.
No. 4.....	Dump scow (106 cubic yards).	70.00	75 0	20 0	5 8	1896	Jefferson

* Remodeled 1895-96.

* Beam over all, 73 feet.

* Rebuilt 1916.

in the Engineer Department at large on Dec. 31, 1916—Continued.

CHICAGO, ILL.—Continued.

Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Chicago, Wis.....	Wood.	\$2,226.00	\$1,800.00	Fair...	374.77	Chicago Harbor, Ill.
.....do.....	.....	255.00	250.00	Good...	15.00	Illinois River.
Michigan City, Ind.	.....do.....	100.00	250.00	.....do.....	118.00	Michigan City Harbor, Ind.
.....do.....	.....do.....	5,000.00	1,850.00	{ Cabin, good; Hull, poor. }	113.86	Illinois River, Ill.
.....do.....	Unknown.	5,600.00	5,600.00	Good..	181.75	Do.
.....do.....	775.00	540.00	540.00	Fair..	41.00	Do.
.....do.....	1,200.00	600.00	600.00	Poor..	248.92	Do.
.....do.....	1,200.00	600.00	600.00	.....do.....	245.05	Do.
.....do.....	1,215.00	1,085.00	1,085.00	Good..	75.00	Do.
.....do.....	895.75	800.00	800.00	.....do.....	66.08	Do.
.....do.....	1,350.00	535.00	535.00	Poor..	243.50	Do.
.....do.....	1,350.00	535.00	535.00	.....do.....	260.75	Do.
.....do.....	1,767.82	1,511.50	1,511.50	Good..	87.18	Do.
.....do.....	1,777.38	1,580.50	1,580.50	.....do.....	95.30	Do.
.....do.....	480.00	450.00	450.00	.....do.....	69.40	Michigan City Harbor, Ind.
.....do.....	439.00	425.00	425.00	.....do.....	48.00	Do.
.....do.....	Wood.	1,526.50	1,550.00	Good..	60.00	Calumet River, Ill. and Ind.

CINCINNATI, OHIO, FIRST DISTRICT.

.....	Steel..	\$98,652.02	\$95,000.00	Good..	\$5,183.13	Improving Ohio River.
.....	Iron...	35,000.00	34,000.00	.....do.....	935.52	Do.
.....do.....	.....do.....	35,000.00	32,500.00	.....do.....	971.78	Do.
.....do.....	Steel and iron.	70,656.36	70,656.00	.....do.....	398.65	Do.
.....do.....	.....do.....	73,397.93	73,397.00	.....do.....	884.24	Do.
.....do.....	.....do.....	133,491.81	48,000.00	.....do.....	920.26	Do.
.....do.....	Steel..	34,426.85	28,500.00	.....do.....	711.76	Do.
.....do.....	.....do.....	2,358.33	500.00	Poor..	55.09	Do.
Cincinnati, Ohio	Wood.	1,102.50	50.00	.....do.....	.....	Do.
.....do.....	Steel..	398.43	300.00	Good..	17.00	Do.
.....do.....	.....do.....	541.50	200.00	Fair..	3.47	Do.
.....do.....	Wood.	260.00	400.00	Good..	367.19	Do.
.....do.....	.....do.....	275.00	100.00	Poor..	17.80	Do.
.....do.....	Steel and iron.	46,026.66	44,000.00	Good..	6,216.27	Do.
.....do.....	.....do.....	46,026.66	44,000.00	.....do.....	6,337.35	Do.
.....do.....	.....do.....	46,120.91	40,000.00	.....do.....	2,397.40	Do.
.....do.....	Steel..	49,691.00	49,691.00	.....do.....	117.78	Do.
.....do.....	.....do.....	49,706.89	49,706.00	.....do.....	127.03	Do.
.....do.....	Wood.	2,000.00	800.00	Poor..	16.60	Do.
.....do.....	Steel..	31,494.00	28,500.00	Good..	494.20	Do.
.....do.....	.....do.....	12,324.08	10,000.00	.....do.....	1,474.83	Do.
.....do.....	.....do.....	12,302.27	10,000.00	.....do.....	2,026.37	Do.
.....do.....	.....do.....	13,444.66	11,000.00	.....do.....	1,044.16	Do.
.....do.....	.....do.....	13,105.81	11,000.00	.....do.....	1,078.79	Do.
.....do.....	Wood.	8,882.61	4,500.00	.....do.....	675.44	Do.
.....do.....	.....do.....	15,306.48	10,000.00	.....do.....	.....	Do.
.....do.....	.....do.....	12,616.39	10,000.00	.....do.....	1,133.53	Do.
.....do.....	.....do.....	2,750.00	1,000.00	Fair..	.....	Do.

TABLE III.—Statement of floating plant owned by the United

CINCINNATI, OHIO, FIRST DISTRICT—Continued.

Name or number.	Type.	Dis- place- ment.	Dimensions.				BUILT.
			Length.	Beam.	Depth.	When.	
		<i>Long tons.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>		
Nos. 5-12.....	Dump scows (125 cubic yards).	74.50	85 8	22 7	6 0	1915	Ambridge
No. 2.....	Flatboat decked (136 tons).	75.00	100 0	20 0	5 0	1903	Levanua,
Nos. 3 and 4.....	Flatboats (3 tons).	3.50	26 0	4 6	1 6	1897	Cincinnati
No. 5.....	Flatboat (6 tons).	8.00	35 0	9 0	1 7	1901	Paducah,
No. 6.....	Flatboat (206 tons).	63.00	110 0	24 0	5 0	1908	Ambridge
Nos. 7, 8, and 9.....	Flatboats (decked).	63.00	110 0	24 0	5 0	1911	do.
Nos. 10-13.....	Flatboats.	32.20	80 0	18 0	4 6	1914	New Alb
No. 14.....	Flatboat (20 tons).	19.10	60 0	20 0	2 2	1914	Cincinnati
Nos. 15-18.....	Flatboats.	60.40	110 0	24 0	5 0	1916	do.
Nos. 1-4.....	Barges (206 tons).	63.07	110 0	24 0	5 0	1911	Ambridge
No. 5.....	do.	63.07	110 0	24 0	5 0	1911	do.
No. 6.....	do.	63.00	110 0	24 0	5 0	1911	do.
No. 7.....	Barge (decked).	39.70	80 0	18 0	5 6	1911	do.
No. 8.....	do.	27.90	60 10	16 0	3 10	1911	do.
No. 9.....	Barge, decked (175 tons).	32.50	90 0	24 0	4 6	1914	Elizabeth
No. 10.....	do.	32.50	90 0	24 0	4 6	1914	do.
No. 11.....	Barge, coal (200 tons).	29.00	90 0	24 0	5 7	1914	do.
No. 12.....	do.	29.00	90 0	24 0	5 7	1914	do.
No. 13.....	Barge, transfer (300 tons)	114.90	100 0	24 0	6 6	1914	do.
No. 14.....	do.	114.90	100 0	24 0	6 6	1914	do.
No. 15.....	Barge.	60.40	110 0	24 0	5 0	1916	Cincinnati
No. 16.....	do.	33.00	90 0	24 0	4 3	1915	Dam No.
No. 17.....	do.	33.00	90 0	24 0	4 3	1915	River.
No. 18.....	do.	33.00	90 0	24 0	4 3	1915	do.
No. 19.....	do.	42.00	90 0	24 0	5 3	1915	do.
No. 20.....	do.	42.00	90 0	24 0	5 3	1915	do.
No. 21.....	do.	42.00	90 0	24 0	5 3	1915	do.
No. 22.....	Barge (transfer).	100 0	26 0	5 3	1915	do.	do.
No. 23.....	do.	100 0	26 0	5 3	1915	do.	do.
No. 24.....	Barge.	60.40	110 0	24 0	5 0	1916	Building.
No. 1.....	Fuel flat 4.	10.00	40 0	14 0	2 10	(⁵)	do.
Nos. 1-10.....	Pontoons.	17.00	40 0	12 0	3 2	1908	Springfield

CINCINNATI, OHIO, SECOND DISTRICT.

Carrollton ⁶	Dipper dredge.....	250.00	86 0	30 0	6 9	1901	Jefferson
Frankfort ⁷	do.....	115.00	72 0	28 0	5 5	1908	Hull at C
Malta ⁸	Endless chain or ladder dredge.	160.00	70 0	31 4	6 10	{1887 1888}	Hull at C Ohio; 1 at Buc; Jefferson
Kentucky.....	Tow and snag boat.....	370.00	148 0	30 0	5 6	1909	do.
Gregory.....	Tow and survey boat (paddle), steam.	240.00	131 0	22 0	4 2	1910	do.
Merrill.....	do.....	163.00	131 6	23 0	3 6	{1907 1908}	do.
Vega.....	do.....	112.00	118 6	19 2	4 0	1901	do.
Pearl.....	Gasoline launch.....	5.00	40 0	7 6	4 0	1901	do.
Pioneer.....	do.....	6.00	35 0	8 6	4 0	1901	do.
No. 4 ⁹	Derrick boat.....	107.00	70 0	32 0	5 0	1896	Cincinnati
No. 5 ¹⁰	do.....	65.00	65 0	30 0	4 10	1895	do.
No. 6 ¹¹	Pile driver.....	50.00	50 0	28 0	3 10	1899	do.
No. 7 ¹²	Needle boat.....	10.00	54 0	10 0	1 10	1909	do.
No. 8 ¹³	do.....	10.00	54 0	10 0	1 10	1910	do.
No. 9 ¹⁴	Work and store boat.....	16.00	50 0	12 0	3 2	1910	do.
No. 10 ¹⁵	Quarter boat.....	22.00	75 0	14 0	1 9	1904	do.

¹ Each.² Total for 8 scows.³ Total for 4.⁴ Formerly drill boat No. 7, Louisville, Ky., district.⁵ Rebuilt 1916.⁶ Rebuilt with new steel hull, 1916.⁷ Rebuilt with new wooden hull, 1916.⁸ Reconstructed in 1909.

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

CINCINNATI, OHIO, FIRST DISTRICT—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Steel..	\$7,775.00	\$7,000.00	Good..	\$107.48	Improving Ohio River.
		Wood..	1,750.00	500.00	Fair..		Do.
		Steel..	194.00	20.00	do..		Do.
		Wood..	100.00	10.00	Poor..		Do.
		Steel..	7,425.00	5,700.00	Good..		Do.
		do..	6,100.00	5,700.00	do..		Do.
		do..	3,639.00	3,200.00	do..	\$878.65	Do.
		Wood..	625.00	400.00	do..	\$31	Do.
		Steel..	5,972.00	5,972.00	do..		Do.
		do..	5,000.00	4,000.00	do..		Do.
		do..	5,000.00	4,000.00	do..	750.00	Do.
		do..	5,000.00	4,708.00	do..		Do.
1911	Cincinnati, Ohio	Wood..	750.00	100.00	Poor..		Do.
1911	do..	do..	750.00	50.00	do..		Do.
		do..	2,214.16	1,600.00	Good..	3.00	Do.
		do..	2,214.16	1,600.00	do..	16.61	Do.
		do..	1,685.42	1,200.00	Fair..		Do.
		do..	1,685.42	1,200.00	do..		Do.
1914	Evansville, Ind.	do..	2,500.00	2,000.00	Good..	42.32	Do.
1914	do..	do..	5,842.93	4,500.00	do..	63.44	Do.
		Steel..	5,730.00	5,730.00	do..		Do.
		Wood..	2,563.56	2,000.00	do..	52.76	Do.
		do..	2,566.08	2,000.00	do..	66.67	Do.
		do..	2,122.64	1,800.00	do..	58.24	Do.
		do..	2,174.69	1,800.00	do..	21.00	Do.
		do..	2,328.80	2,000.00	do..	47.13	Do.
		do..	2,297.92	2,000.00	do..	53.15	Do.
		do..	3,413.16	2,700.00	do..	11.06	Do.
		do..	3,400.54	2,700.00	do..	17.23	Do.
		Steel..	5,730.00		do..		Do.
1913	Louisville, Ky.	Wood..	50.00	300.00	do..	175.00	Do.
		Steel..	13,800.00	12,000.00	do..		Do.

CINCINNATI, OHIO, SECOND DISTRICT.

		do..	\$22,272.00	\$25,100.00	do..	\$1,362.52	Kentucky River, Ky.
		Wood..	10,193.26	14,000.00	do..		Do.
		do..	13,000.00	7,380.00	Fair..	782.37	Muskingum River, Ohio.
		do..	27,078.50	16,800.00	Good..	3,308.15	Kentucky River, Ky.
		do..	16,915.00	13,000.00	do..	436.72	Do.
		do..	14,400.00	7,140.00	Fair..	120.99	Muskingum River, Ohio.
		do..	9,805.00	2,000.00	Poor..	29.85	Do.
1899	Grand Rapids, Mich.	do..	1,705.00	450.00	Bad..	20.00	Kentucky River, Ky.
1908	Bay City, Mich.	do..	1,975.00	630.00	do..	10.80	Big Sandy River, W. Va. and Ky.
		Steel..	Unknown.	9,000.00	Good..	2,781.94	Kentucky River, Ky.
		Unknown.		5,700.00	do..	2,361.66	Do.
		Wood..	1,665.00	1,500.00	do..	400.37	Muskingum River, Ohio.
		do..	235.63	20.00	Bad..		Kentucky River, Ky.
		do..	348.69	20.00	do..		Do.
		do..	806.24	450.00	Good..		Muskingum River, Ohio.
		do..	1,600.00	600.00	Poor..	35.94	Do.

* Formerly No. 1; reconstructed with new steel hull, 1915.

** Formerly No. 2; rebuilt with new steel hull, 1913.

† Rebuilt in 1909-10.

‡ Formerly Kentucky No. 1.

§ Formerly Kentucky No. 2.

|| Formerly Muskingum No. 1.

¶ Formerly Muskingum No. 2.

TABLE III.—Statement of floating plant owned by the United States and
CINCINNATI, OHIO, SECOND DISTRICT—Continued.

Name or number.	Type.	Dis- place- ment.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where
		<i>Long tons.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>		
No. 11 ¹	Quarter boat	40.00	90 0	18 0	3 6	1900	Cincinnati, Ohio
No. 18 ²	72-ton deck barge	94.00	75 0	15 6	4 0	1909	do
No. 21 ³	19-ton deck barge	25.00	40 0	12 0	2 8	1911	do
No. 23	190-ton deck barge	45.00	98 0	18 0	5 0	1895	do
No. 25 ⁴	120-ton deck barge	31.00	63 6	19 0	5 0	1896	do
No. 26 ⁵	300-ton deck barge	50.00	99 0	20 0	6 0	1908	Point Pleasant, W. Va.
No. 27 ⁶	do	50.00	99 0	20 0	6 0	1908	do
No. 28 ⁷	35-ton open barge	8.00	55 0	10 0	3 6	1896	Cincinnati, Ohio
No. 29 ⁸	300-ton deck barge	50.00	99 0	20 0	5 4	1910	Point Pleasant, W. Va.
No. 33 ⁹	10-ton push boat	14.00	36 0	10 0	1 8		
No. 35 ¹⁰	12-ton push boat	17.00	40 0	10 0	1 10		
No. 36	80-cubic-yard dump scow	30.00	75 0	17 0	6 5	1911	Jeffersonville, Ind.
No. 37	do	30.00	75 0	17 0	6 5	1911	do
No. 38	Maneuver boat	65.00	65 0	30 0	5 2	1911	Louisia, Ky.
No. 39	do	50.00	60 0	28 0	3 4	1911	do
No. 41	10-ton push boat	14.00	36 0	10 0	1 8	1911	do
No. 42	200-ton deck barge	220.00	100 0	20 0	5 0	1912	Ambridge, Pa.
No. 43	do	220.00	100 0	20 0	5 0	1912	do
No. 44	Quarter boat	40.00	50 0	22 0	3 6	1912	Pittsburgh, Pa.
No. 45	Maneuver boat	75.00	65 0	30 0	4 10	1913	New Albany, Ind.
No. 46	do	55.00	60 0	28 0	3 6	1913	do
No. 47	do	55.00	60 0	28 0	3 6	1915	Jeffersonville, Ind.
No. 48	200-ton deck barge	220.00	100 0	20 0	5 0	1915	Ambridge, Pa.
No. 49	do	220.00	100 0	20 0	5 0	1915	do
No. 50	150-ton deck barge	150.00	80 0	18 0	4 3	1914	New Albany, Ind.
No. 51	90-ton deck barge	140.00	80 0	18 0	4 6	1914	do
No. 52	do	140.00	80 0	18 0	4 6	1914	do
No. 53	125-cubic yard dump scow	75.00	85 9	22 8	6 0	1915	Ambridge, Pa.
No. 54	do	75.00	85 9	22 8	6 0	1915	do
No. 55	Needle boat	10.00	54 0	10 0	1 8	1916	Frankfort, Ky.
No. 56 ⁴	Maneuver boat	55.00	60 0	26 0	3 6	1916	Hull at Ambridge, Pa.; machinery transferred from old boat.
No. 57	Needle boat	10.00	54 0	10 0	1 8	1916	Frankfort, Ky.
No. 58	do	10.00	54 0	10 0	1 8	1916	do
No. 59	92-cubic yard dump scow	200.00	56 6	26 9	6 1	1916	McConnellsville, Ohio
No. 60	do	200.00	56 6	26 9	6 1	1916	do
No. 61	10-ton push boat	14.00	36 0	10 0	1 8	1913	Louisia, Ky.
No. 62	Needle boat	10.00	54 0	10 0	1 8	1916	Frankfort, Ky.

¹ Formerly Kentucky No. 1.² Formerly No. 2.³ Formerly No. 6.⁴ Formerly No. 8.⁵ Formerly No. 10.⁶ Formerly No. 11.

in the Engineer Department at large on Dec. 31, 1916—Continued.

CINCINNATI, OHIO, SECOND DISTRICT—Continued.

Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
.....	Wood.	\$1,200.00	\$630.00	Good..	60.00	Kentucky River, Ky.
.....	do.	700.00	270.00	Fair..	.....	Muskingum River, Ohio.
.....	do.	447.27	180.00	do.	33.24	Do.
.....	Unknown.	.....	630.00	Poor..	185.50	Kentucky River, Ky.
.....	Unknown.	.....	630.00	Fair..	160.00	Do.
.....	do.	2,150.00	1,080.00	do.	135.80	Do.
.....	do.	2,150.00	1,350.00	do.	147.30	Do.
.....	Unknown.	.....	45.00	Poor..	24.00	Do.
.....	do.	2,200.00	1,080.00	Fair..	121.00	Do.
.....	.....	124.50	58.00	do.	12.50	Big Sandy River, W. Va. and Ky.
.....	.....	65.00	72.00	Good..	.....	Do.
.....	.....	3,220.00	90.00	Bad..	.....	Kentucky River, Ky.
.....	.....	3,220.00	90.00	do.	.....	Do.
.....	.....	5,068.69	3,000.00	Fair..	32.00	Big Sandy River, W. Va. and Ky.
.....	.....	3,367.87	1,800.00	do.	4.00	Do.
.....	.....	146.28	72.00	do.	.....	Do.
.....	Steel..	4,900.00	3,325.00	Good..	.....	Kentucky River, Ky.
.....	do.	4,900.00	3,325.00	do.	.....	Do.
.....	do.	3,026.92	1,900.00	do.	.....	Do.
.....	do.	8,649.20	8,170.00	do.	59.82	Big Sandy River, W. Va. and Ky.
.....	do.	6,836.55	6,365.00	do.	24.35	Do.
.....	do.	4,575.00	4,457.02	do.	92.62	Do.
.....	do.	4,850.00	4,275.00	do.	.....	Kentucky River, Ky.
.....	do.	4,850.00	4,275.00	do.	.....	Do.
.....	do.	3,699.09	3,420.00	do.	.....	Big Sandy River, W. Va. and Ky.
.....	do.	3,736.98	3,515.00	do.	.....	Muskingum River, Ohio.
.....	do.	\$3,708.67	\$3,515.00	do.	.....	Do.
.....	do.	7,775.00	7,125.00	do.	.....	Kentucky River, Ky.
.....	do.	7,775.00	7,125.00	do.	.....	Do.
.....	do.	1,501.69	1,425.00	do.	.....	Do.
.....	do.	127,526.47	8,000.00	do.	.....	Big Sandy River, W. Va. and Ky.
.....	do.	1,191.31	1,100.00	do.	.....	Kentucky River, Ky.
.....	do.	1,142.25	1,100.00	do.	.....	Do.
.....	Wood.	3,936.98	3,500.00	do.	.....	Muskingum River, Ohio.
.....	do.	3,936.98	3,500.00	do.	.....	Do.
.....	do.	120.75	90.00	do.	.....	Big Sandy River, W. Va. and Ky.
.....	Steel..	1,432.34	1,425.00	do.	.....	Kentucky River, Ky.

formerly No. 12.

formerly No. 13.

formerly Louisiana No. 1.

formerly Louisiana No. 3.

Installation of machinery and construction of steel cabin not completed on Dec. 31, 1916.

Cost to date.

TABLE III.—Statement of floating plant owned by the United States Army.

CLEVELAND, OHIO.

Name or number.	Type.	Displacement.	Dimensions.			When.	Buft.
			Length.	Beam.	Depth.		
		<i>Long tons.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>		
Burton.....	Seagoing hopper dredge.	1,510.00	177 0	38 0	19 0	1905	Sparrows Point
Maumee.....	Dipper dredge.	549.00	100 0	26 2	11 0	1904	Cleveland, Ohio
Spear.....	Steam tug.	160.00	87 0	19 8	11 0	1904	Huron, Ohio
Quest.....	do.	45.00	65 0	15 0	8 0	1903	Ashtabula
Inspector.....	do.	6.00	32 2	6 6	4 7	1901	Detroit, Mich.
Ariel.....	do.	6.00	36 0	7 3	4 7	1905	Ashtabula
Burton No. 22 ¹	do.	50	20 0	4 2	2 4	1905	Cleveland
No. 1.....	400-ton derrick barge.	185.00	102 6	32 0	7 10	1906	Superior, Wis.
No. 4.....	Dump scow, 7 pockets.	(²)	125 0	34 0	10 6	1907	Port Clinton
No. 5.....	do.	(³)	125 0	34 0	10 6	1907	do.
No. 2.....	Deck scow.		23 1	11 6	2 6	1906	Ashtabula

DALLAS, TEX.

Sabine.....	Seagoing hopper dredge.	750.00	137 0	35 0	12 0	1901	New York
Orange.....	Hydraulic pipe line dredge.	547.00	115 0	36 0	9 6	1912	Baltimore
Culbertson, C. A.....	Snag boat.	200.00	106 0	28 0	5 0	1906	Jeffersonville
Trinity.....	do.	190.00	123 5	30 0	5 0	1904	Texas City
Denison.....	do.	250.00	136 0	32 0	4 6	1915	Dubuque
Beaumont.....	Gasoline launch.	32.00	58 2	13 7	8 5	1913	Houston, Tex.
Caddo.....	do.	2.50	30 0	8 0	3 0	1911	Fulton, Ark.
Ino.....	do.	2.00	27 10	8 4	4 0	1913	Liberty, Tex.
Jefferson.....	do.	2.00	30 7	7 0	5 6	1913	Port Arthur
Juanita.....	do.	1.00	22 0	6 0	2 2	1910	Fulton, Ark.
Liberty.....	do.	2.00	26 0	7 0	2 10	1913	Liberty, Tex.
Neches.....	do.	1.10	26 0	6 0	2 4	1912	Salem, Ohio
Bextant.....	do.	2.00	27 0	6 0	4 0	1906	Clinton, Ohio
Maneuver boat No. 1.....	Scow.	15.00	45 10	16 0	3 4	1910	Lock and Dam
Maneuver boat No. 2.....	do.	22.00	44 1	20 0	3 7	1914	Lock and Dam
No. 1, Neches River.....	Quarter boat.	27.00	60 0	16 0	4 0	1906	Beaumont
do.	do.	24.00	60 0	22 0	3 0	1909	Lock and Dam
No. 2, Cypress Bayou.....	do.	35.00	66 6	22 0	3 6	1912	Trinity
No. 3, Red River.....	do.	25.00	62 0	18 0	2 10	1913	Denison, Tex.
No. 4, Trinity River.....	do.	35.00	66 6	22 0	3 6	1912	Ferris, Tex.
Barge No. 1.....	32-ton barge.	24.00	38 0	14 0	5 0	1902	Port Arthur
Barge No. 2.....	30-ton barge.	19.00	32 0	14 0	5 0	1909	do.
Barge No. 3.....	do.	19.00	32 0	14 0	5 0	1909	do.
Barge No. 4.....	Scow.	24.30	69 4	18 0	4 6	1913	Orange, Tex.
Barge No. 5.....	do.	32.00	74 0	18 0	4 0	1911	Johnsons Creek
Barge "A".....	Steel oil barge.	61.00	80 0	20 0	5 6	1916	Galveston
No. 6.....	Scow.	14.00	40 2	14 0	4 3	1916	Port Arthur

NOTE.—The gasoline launch Sulphur has been dropped from the property return for six months Sept. 30, 1916.

¹ Rebuilding in 1909, \$42,000.² Hull and house boiler and machinery from old discarded tug was installed.³ Formerly Burton No. 1.⁴ 500 yards capacity.

and in the Engineer Department at large on Dec. 31, 1916—Continued.

CLEVELAND, OHIO.

Purchased.						
Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Parrows Point, Md.	Steel..	\$184,300.00	\$150,000.00	Excellent.	\$5,245.06	Cleveland, Ohio, district.
Cleveland, Ohio.	Wood..	128,000.00	35,000.00	Good..	3,148.51	Do.
		10,500.00	18,500.00	..do..	6,301.21	Do.
Weshtabula, Ohio.	Wood..	8,000.00	1,000.00	Fair..	12.64	Do.
Detroit, Mich.	..do..	1,375.00	400.00	..do..	30.26	Do.
Weshtabula, Ohio.	..do..	680.00	500.00	..do..	.....	Do.
Cleveland, Ohio.	..do..	250.00	100.00	Good..	.....	Do.
Waltham, Minn.	..do..	11,870.00	9,700.00	..do..	111.64	Do.
Port Clinton, Ohio.	..do..	11,428.00	10,000.00	Fair..	361.29	Do.
..do..	..do..	11,477.00	10,000.00	..do..	361.29	Do.
Weshtabula, Ohio.	..do..	100.00	Worthless.	Unserviceable.	.....	Do.

DALLAS, TEX.

..do..	Wood..	\$84,833.40	\$25,000.00	Poor..	\$2,859.80	Improving Sabine Pass, Tex.
..do..	..do..	84,520.00	62,500.00	Good..	5,910.92	Port Arthur Canal, Tex.
..do..	..do..	21,840.00	10,000.00	Fair..	.....	Red River, La. and Ark., above Fulton.
..do..	..do..	19,500.00	10,000.00	..do..	2,335.80	Trinity River, Tex.
..do..	Steel..	62,000.00	51,000.00	Good..	80.00	Red River, La. and Ark.
..do..	Wood..	6,738.50	4,000.00	Fair..	477.39	Sabine-Neches Canal, Tex.
..do..	..do..	1,000.00	100.00	Poor..	17.46	Cypress Bayou, Tex. and La.
..do..	..do..	125.00	350.00	Good..	25.75	Trinity River, Tex.
..do..	..do..	1,121.48	800.00	..do..	83.12	Sabine-Neches and Port Arthur Canals.
..do..	..do..	315.05	50.00	Poor..	17.00	Red River, La. and Ark.
..do..	..do..	1,105.94	450.00	Fair..	170.73	Trinity River, Tex.
..do..	Galv. steel.	1,581.25	200.00	Poor..	124.72	Sabine-Neches Canal, Tex.
..do..	Wood..	1,528.00	50.00	..do..	.....	Port Arthur Canal.
..do..	..do..	750.00	25.00	..do..	.....	Locks and Dams, section 1, Trinity River, Tex.
..do..	..do..	2,168.83	1,600.00	Good..	.....	Lock and Dam No. 7, Trinity River, Tex.
Seasont, Tex.	..do..	750.00	100.00	Poor..	.....	Sabine-Neches Canal, Tex.
..do..	..do..	1,250.00	10.00	..do..	.....	Trinity River, Tex.
..do..	..do..	2,458.73	800.00	Fair..	.....	Cypress Bayou, Tex.
..do..	..do..	1,305.51	800.00	..do..	.....	Red River, La. and Ark.
..do..	..do..	2,230.36	500.00	..do..	.....	Trinity River, Tex.
Port Arthur, Tex.	..do..	.....	15.00	Poor..	25.00	Port Arthur Canal.
..do..	..do..	750.00	25.00	..do..	60.00	Do.
..do..	..do..	750.00	25.00	..do..	55.00	Do.
..do..	..do..	1,800.00	1,200.00	Good..	512.63	Do.
Port Arthur, Tex.	..do..	700.00	25.00	Poor..	60.00	Sabine-Neches Canal, Tex.
Galveston, Tex.	Steel..	9,960.00	9,960.00	Good..	.....	Sabine-Neches and Port Arthur Canals.
..do..	Wood..	994.64	994.64	..do..	.....	Do.

TABLE III.—Statement of floating plant owned by the United States and
DETROIT, MICH.

Name or number.	Type.	Dis- place- ment.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
Gen. G. J. Lydecker ¹ .	Survey steamer	<i>Long tons.</i> 120.00	<i>Ft. in.</i> 125 0	<i>Ft. in.</i> 18 3	<i>Ft. in.</i> 10 0	1909	Boston, Mass.
Alfred Noble.....	.....do.....	83.00	76 6	15 6	7 0	1905	Toledo, Ohio.....
West Noebish.....	Tug.....	47.40	59 6	15 1	6 6	1909	Sault Ste. Marie, Mich.
Sapper.....	.....do.....	59.00	76 4	18 4	9 6	1888	Buffalo, N. Y.; re- built at Toledo, Ohio.
Custodian.....	Gasoline launch.....	23 6	7 3	2 4	1915	St. Clair Flats, Mich.	
Don.....	.....do.....	9.00	41 9	9 7	4 7	1904	Detroit, Mich.
Lad.....	.....do.....	23 0	6 6	2 0	1898	Sault Ste. Marie, Mich.	
Gen G. J. Lydecker No. 1. ¹	.....do.....	20 6	5 0	2 0	1909	Boston, Mass.	
Gen. G. J. Lydecker No. 2. ²	.....do.....	15 6	4 6	1 9	1909	.....do.....	
Hay Lake.....	Quarter boat.....	106.00	70 0	22 0	4 4	1895	Sault Ste. Marie, Mich.
No name.....	Derrick scow.....	76 6	22 0	6 5	1902	Detroit, Mich.	
No. 3.....	Floating derrick.....	236.00	50 0	42 0	12 0	1913	Green Bay, Wis.
No. 3 ³	Clam-shell and orange- peel derrick boat.....	76.00	80 0	22 0	6 4	1905- 1915	Sault Ste. Marie, Mich.
No. 5.....	Deck scow.....	55.00	80 0	22 0	6 4	1905	.....do.....
No. 6.....	.....do.....	55.00	80 0	22 0	6 4	1907	.....do.....
No. 7.....	.....do.....	25.00	50 0	18 0	5 6	1912	.....do.....

DETROIT, MICH. (LAKE SURVEY.)

Surveyor ⁹	Survey steamer.....	176.00	98 0	20 1	8 5	1891	South Haven, Mich.
Col. J. L. Lusk ⁹	do.....	295.00	123 11	19 4	11 10	1884	Manistee, Mich.....
Search ¹⁰	do.....	200.00	158 6	18 0	10 0	1896	Buffalo, N. Y.....
U. S. Lake Survey No. 1. ¹¹	do.....	56.00	70 1	13 6	6 6	1891	Oshkosh, Wis.....
U. S. Lake Survey No. 2. ¹²	do.....	48.00	70 3	14 6	7 6	1909	Detroit, Mich.....
U. S. Lake Survey No. 3. ¹³	Motor Launch.....	2.60	22 3	6 3	3 2	1902	St. Joseph, Mich.....
U. S. Lake Survey No. 4.....	do.....	10.00	38 6	11 0	4 2	1905	Detroit, Mich.....
U. S. Lake Survey No. 5.....	do.....	10.00	36 0	9 0	4 0	1909	Manitowoc, Wis.....
U. S. Lake Survey No. 6.....	do.....	10.00	36 0	9 0	4 0	1909	.....do.....
U. S. Lake Survey No. 8.....	do.....	2.40	23 3	6 7	3 3	1913	Detroit, Mich.....
Inspector.....	do.....	26.00	50 3	8 9	4 8	1903	Racine, Wis.....
Netnokwa ¹⁴	do.....	10.00	37 4	7 4	5 6	.....	New York City.....
No. 1.....	Catamaran.....	27 0	21 0	2 0	2 0	1896	Detroit, Mich.....
No. 2.....	do.....	27 0	21 0	2 0	2 0	1899	do.....
No. 3.....	do.....	33 6	21 0	2 0	2 0	1899	do.....
No. 1.....	Sweeping float (2 sec- tions).	30 0	80 0	3 4	1902	Port Huron, Mich.....	

¹ Formerly Gladwin.² Built by United States by contract.³ Dismantled.⁴ Formerly Gladwin No. 1.⁵ Formerly Gladwin No. 2.⁶ Formerly deck scow No. 3.⁷ Built by United States.⁸ Formerly Lorain L.⁹ Formerly Gen. Williams.

ed in the Engineer Department at large on Dec. 31, 1916—Continued.

DETROIT, MICH.

Purchased.						
Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Toledo, Ohio....	Wood.	\$32,000.00	\$20,000.00	Fair...	\$447.08	Several appropriations for the Detroit, Mich., district.
(?)	Steel..	19,800.00	14,000.00	...do..	621.87	Middle and West Neebish Channels, St. Marys River, Mich.
(?)	Wood.	7,068.50	7,000.00	Good .	46.65	Hay Lake and Neebish Channels, St. Marys River, Mich.
Toledo, Ohio....	...do..	9,500.00	6,000.00	Fair...	2,256.99	Harbors at Cheboygan, Alpena, Harbor Beach, Mich., and Saginaw and Black Rivers, Mich.
St. Clair Flats, Mich.	...do..	426.05	400.00	Good .	1.98	Operating and care, St. Clair Flats Canal, Mich.
Detroit, Mich.	...do..	2,170.00	1,400.00	...do..	679.64	Detroit River, Mich.
...do..	...do..		10.00	(*)	None.	
Toledo, Ohio....	...do..		400.00	Fair..	None.	Part outfit U. S. S. Gen. G. J. Lydecker.
...do..	...do..		350.00	...do..	None.	Do.
(?) .....	...do..	3,300.00	1,400.00	...do..	None.	Hay Lake and Neebish Channels, St. Marys River, Mich.
(?) .....	...do..	4,600.00	2,800.00	...do..	None.	Detroit River, Mich.
(?)	Steel..	25,170.00	24,000.00	Good .	24.80	St. Marys River, Mich. (locks and canals).
(?)	Wood.	4,000.00	2,500.00	Fair ..	364.99	Do.
(?) .....	...do..	1,600.00	1,100.00	Good .	497.97	St. Marys River, Mich.
(?) .....	...do..	1,500.00	800.00	Poor..	None.	Do.
(?) .....	...do..	1,020.00	750.00	Good .	None.	Do.

DETROIT, MICH. (LAKE SURVEY).

Mackinac, Mich.	Wood.	Unknown.	\$11,000.00	Good..	\$1,065.46	Survey northern and northwestern lakes.
Manitowish, Mich.	...do..	Unknown.	17,000.00	...do..	2,842.58	Do.
Ruffalo, N. Y.	Steel..	Unknown.	18,000.00	...do..	1,844.55	Do.
Milwaukee, Wis.	Wood.	\$5,020.44	2,000.00	Fair...		Do.
...do..	...do..	Unknown.	3,000.00	Good..	151.03	Do.
St. Joseph, Mich.	...do..	940.00	150.00	Fair...		Do.
...do..	...do..	1,000.00	800.00	Good..	186.56	Do.
...do..	...do..	1,425.00	700.00	...do..	90.60	Do.
...do..	...do..	1,425.00	700.00	...do..	164.44	Do.
...do..	...do..	725.00	300.00	Fair...	44.53	Do.
Milwaukee, Wis.	Steel..	5,000.00	1,400.00	...do..	312.50	Do.
Sault Ste. Marie, Mich.	Wood.	Unknown.	1,000.00	Good..	129.47	Do.
Detroit, Mich.	...do..	\$1,248.33	250.00	Fair...		Do.
...do..	...do..	1,248.33	100.00	Poor..		Do.
...do..	...do..	1,248.33	100.00	...do..		Do.
Port Huron, Mich.	...do..	8,000.00	750.00	Good..		Do.

Formerly Enquirer.

Formerly Gen. G. K. Warren.

¹² Formerly Fanny H. Compass.

¹³ Formerly Stadia.

¹⁴ Formerly Chum.

TABLE III.—Statement of floating plant owned by the United States

DULUTH, MINN.

Name or number.	Type.	Displacement	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	
Circle.....	Steam tug.....	Long tons. 38.00	53 6	14 3	6 6	1895	Duflalo, N. Y....
Essayoos.....	.....do.....	160.00	85 0	21 0	11 6	1908	Muskegon, Mich....
Gen. C. B. Sears.....	Steam survey boat.....	260.00	110 7	23 0	12 6	1915	.....do.....
Curve.....	Gasoline launch.....	2.00	22 6	5 5	2 7	.....	St. Joseph, Mich....
Oskar.....	.....do.....	1.50	20 0	5 1	3 0	.....	.....do.....
Nernadji.....	Gasoline tug.....	20.00	60 9	12 0	6 2	1912	Racine, Wis....
No. 1.....	Scow (Flat).....	48.00	90 0	29 0	6 6	.....	.....do.....
No. 4.....	.....do.....	36.00	57 0	24 0	3 6	1904	Superior Entry, Wis....
No. 7.....	400-ton derrick scow.....	184.00	102 6	32 0	7 10	1907	.....do.....
No. 8.....	70-ton derrick scow.....	40.00	70 0	20 0	5 6	1907	.....do.....
No. 10.....	Pile driver.....	56.00	60 0	26 0	3 10	1908-9	.....do.....
No. 11.....	Steel dump scow.....	280.00	125 8	31 6	12 0	1916	Ferrysburg, Mich....
No. 12.....	.....do.....	280.00	125 8	31 6	12 0	1916	.....do.....
Col. D. D. Gaillard....	Steel dipper dredge.....	780.00	116 0	40 0	11 6	1916	Green Bay, Wis....

GALVESTON, TEX.

Galveston.....	Seagoing hopper dredge.....	3,500.00	304 0	51 0	27 0	1908	Sparrows Point, Md....
Comstock.....	.....do.....	1,100.00	155 0	35 0	17 0	1915	Baltimore, Md....
Sam Houston.....	Hydraulic pipe line dredge.....	981.00	148 6	38 0	12 0	1915	Galveston, Tex....
San Jacinto.....	.....do.....	981.00	148 6	38 0	12 0	1915	.....do.....
Col. A. M. Miller.....	.....do.....	942.60	138 6	37 0	13 0	1906	.....do.....
San Bernard.....	.....do.....	440.00	83 0	22 0	7 6	1906	.....do.....
Guadalupe.....	.....do.....	.....	118 0	23 0	5 9	1908	Victoria, Tex....
Waco.....	Snag boat.....	200.00	118 0	30 2	5 0	1910	Jeffersonville, Ind....
San Luis.....	Steam tug (screw).....	161.37	121 0	26 0	13 5	1911	Baltimore, Md....
Capt. Talfor.....	.....do.....	43.00	80 0	17 0	8 0	1905	Scranton, Miss....
Colonel.....	Gasoline launch (screw).....	31.00	66 8	12 6	5 6	1906	New York, N. Y....
E. M. Hartrick.....	.....do.....	42.00	60 0	15 1	7 0	1915	Morehead City, N. C....
Helen.....	.....do.....	33.00	56 0	12 4	5 9	1901	Galveston, Tex....
Bastrop.....	.....do.....	16.00	46 6	11 6	5 0	1908	Cedar Bayou, Tex....
Cavallo.....	.....do.....	12.00	39 10	8 10	5 9	1916	Galveston, Tex....
Victoria.....	.....do.....	11.00	34 0	7 8	5 2	1915	.....do.....
Hill.....	.....do.....	7.00	31 5	7 7	2 6	1905	Ata Loma, Tex....
Anahua.....	.....do.....	6.00	28 0	8 2	3 6	1915	Galveston, Tex....

oyed in the Engineer Department at large on Dec. 31, 1916—Continued.

DULUTH, MINN.

Purchased.						
Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Duluth, Minn...	Wood.	\$4,100.10	\$1,700.00	Fair...	\$452.47	General repairs Keweenaw, Waterway, Mich.
.....	Steel..	35,950.00	33,793.00	Good..	925.65	General work in district.
.....	do.	75,506.00	91,000.00	.....do..	1,675.86	Inspection and general work in district.
St. Joseph, Mich.	Wood.	800.00	300.00	Fair...	4.94	Patrol Portage River, Keweenaw Waterway, Mich.
Houghton, Mich	.....do..	250.00	250.00	Good..	.....	Patrol Portage Canals, upper entrance.
.....	do.	14,000.00	13,020.00	.....do..	195.80	Harbor patrol and inspection, Duluth-Superior Harbor.
Duluth, Minn...	.....do..	2,000.00	800.00	Fair...	26.45	Duluth, Minn., district for general repairs.
.....	do.	2,100.00	100.00	Poor ..	.....	Do.
.....	do.	11,907.00	6,787.00	Fair...	354.81	Do.
.....	do.	4,103.00	2,800.00	Good..	88.46	Repairing breakwater and revetments, Keweenaw Waterway, Mich.
.....	do.	3,918.00	2,500.00	.....do..	149.96	Improvement and repairs, Duluth-Superior Harbor, and Keweenaw Waterway, Mich.
.....	Steel..	25,525.00	25,525.00	Excel-	.....	Dredging throughout the district.
.....	do.	25,525.00	25,525.00	.....do..	.....	Do.
.....	do.	108,184.00	108,000.00	.....do..	400.22	Do.

GALVESTON, TEX.

.....	Steel..	\$357,000.00	\$300,000.00	Good..	\$10,612.17	Improving harbor at Galveston, Tex.
.....	do...	210,433.68	210,000.00	Excel-	11,923.89	Improving Port Aransas, Tex., and mouth of Brazos River, Tex.
.....	Wood.	159,972.50	.....do..	.....do..	41,477.97	Improving Houston Ship Channel, Tex.
.....	do...	159,972.50	.....do..	.....do..	28,035.01	Do.
.....	do...	102,000.00	.....do..	Good..	28,387.20	Improving harbor at Galveston, Tex.
Galveston, Tex..	.....do..	29,500.00	.....do..	Poor ..	4,954.27	Inland waterway on coast of Texas.
.....	do...	58,000.00	.....do..	Good..	6,541.68	Inland waterway on coast of Texas (Guadalupe River).
.....	do...	29,935.00	.....do..	.....do..	681.53	Improving Brazos River, Tex.
Baltimore, Md..	Steel..	78,000.00	95,000.00	Excel-	6,217.19	Galveston Harbor and Channel and Houston Ship Channel, Tex.
.....	Wood.	12,000.00	.....do..	Good..	189.74	Do.
Jacksonville, Fla.	.....do..	6,500.00	10,000.00	Excel-	4,843.37	All appropriations of this district.
.....	do...	13,500.00	13,000.00	.....do..	2,275.70	Improving Houston Ship Channel, Tex.
.....	do...	10,000.00	.....do..	.....do..	827.59	Galveston Harbor and Channel and Houston Ship Channel, Tex.
.....	do...	4,300.00	3,000.00	Good..	1,450.49	Inland waterway on coast of Texas (Guadalupe River).
.....	do...	5,911.85	5,900.00	Excel-	83.03	Inland waterway on coast of Texas.
.....	do...	2,800.00	2,500.00	Good..	117.87	Do.
.....	do...	2,000.00	1,500.00	Good..	177.96	Do.
.....	do...	2,582.81	2,500.00	.....do..	279.24	All appropriations of this district.

TABLE III.—Statement of floating plant owned by the United States

GALVESTON, TEX.—Continued.

Name or number.	Type.	Displacement.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
		<i>Long tons.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>		
Neuces.....	Gasoline launch (screw).	6.00	31 0	8 3	3 6	1915	St. Louis, Mo..
Lavaca.....	do.....	4.00	26 0	7 4	3 6	1916	Galveston, Tex.
Mezquite.....	do.....	4.00	30 6	8 10	3 10	1916	Wareham, Mass.
Palacios.....	do.....	3.00	31 0	8 3	5 10	1916	Galveston, Tex.
Mustang.....	do.....	2.50	20 0	5 9	2 5	1916	do.....
Copano.....	do.....	2.00	28 6	7 0	4 4	1916	do.....
"G".....	do.....	1.50	25 7	8 2	3 6	1908	Camden, N. J.
Commodore.....	do.....	1.00	23 4	6 0	3 2	1910	Galveston, Tex.
St. Joseph.....	do.....	.60	22 0	5 0	3 5	1916	Port Aransas, T.
D. B. No. 1.....	Derrick barge.....	116.00	65 0	27 0	5 6	1908	Galveston, Tex.
D. B. No. 2.....	do.....	65.00	65 0	26 0	5 0	1915	Victoria, Tex.
D. B. No. 4.....	do.....	140.00	70 0	26 1	4 10	1902	Galveston, Tex.
Quarter boat No. 1...	Quarter boat.....	81.00	60 8	23 7	7 6	1907	do.....
B. No. 1.....	Barge.....	65.00	50 0	22 0	7 0	1907	Lockport, La.
B. No. 3.....	do.....	65.00	50 0	22 0	7 0	1907	do.....
B. No. 4.....	Oil and water barge.....	41.00	50 0	20 0	5 6	1908	Seabrook, Tex.
B. No. 5.....	do.....	144.00	80 0	28 0	8 0	1908	Galveston, Tex.
B. No. 8.....	do.....	250.00	100 0	30 0	10 0	1915	Gulfport, La.
B. No. 9.....	do.....	250.00	100 0	30 0	10 0	1915	do.....

GRAND RAPIDS, MICH.

Meade, Gen. G. G....	Seagoing hopper dredge.	1,458.00	177 0	38 0	19 0	1904	Sparrows Point,
Saginaw.....	Bucket dredge.....	92.00	83 9	23 0	6 7	1891	Saginaw, Mich.
Gillmore, Gen.....	Steam tug.....	\$ 47.00	61 6	15 0	4 10	1906	Grand Haven, M.
Hancock.....	{Survey and inspection steamer.	.....	97 10	17 6	7 6	{1890 1906	{Saugatuck, Mich. rebuilt Detroit Mich.
Engineer.....	Gasoline launch.....	\$ 10.00	37 6	7 8	2 2	1902	Grand Rapids, M.
Ludington.....	do.....	\$ 1.47	22 4	5 0	2 4	1909	.....do.....
Hancock No. 2.....	do.....	2.50	16 0	5 0	2 4	1916	.....do.....

HONOLULU, HAWAII.

Nola.....	Launch.....	35 0	7 6	4 6	1911	Seattle, Wash.
Wiki.....	Flat.....	84.00	65 0	25 0	6 0	1908 Pearl Harbor, Ha.
No. 1 ⁷	Anchor scow.....	29.00	40 0	18 0	4 5	Unknown.....
No. 2 ⁷	Oil scow.....	29.00	40 0	18 0	4 5	.....do.....
Mae Muat.....	Launch.....	30 6	8 4	3 10	.....	.....do.....

¹ Rebuilt at Grand Haven, Mich., in 1906, from dipper dredge to derrick, at cost of \$6,500.² Hull rebuilt and machinery repaired in 1916.³ Measured tonnage; displacement not known.⁴ Built by United States.

ed in the Engineer Department at large on Dec. 31, 1916—Continued.

GALVESTON, TEX.—Continued.

Purchased.						
Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
St. Louis, Mo...	Wood.	\$3,050.00	\$3,000.00	Excellent.	\$1,900.17	All appropriations of this district.
.....do....	.....do....	1,687.91	1,600.00	.....do....	38.86	Improving Houston Ship Channel, Tex.
Wareham, Mass. ....do....	.....do....	1,794.00	1,750.00	.....do....	594.44	All appropriations of this district.
.....do....	.....do....	1,492.44	1,400.00	.....do....	134.91	Improving Houston Ship Channel, Tex.
.....do....	.....do....	750.00	725.00	.....do....	254.48	Improving Port Aransas and Mouth of Brazos River, Tex.
.....do....	.....do....	1,425.89	1,400.00	.....do....	91.91	Improving Houston Ship Channel, Tex.
.....do....	.....do....	975.00	500.00	Fair...	747.71	Improving harbor at Galveston, Tex.
.....do....	.....do....	884.06	550.00	Good..	.....	Do.
.....do....	.....do....	525.00	525.00	Excellent.	.....	Improving Port Aransas, Tex.
.....do....	.....do....	8,800.00	5,000.00	Fair...	671.60	Improving Houston Ship Channel.
.....do....	.....do....	10,642.33	10,500.00	Excellent.	1,162.49	Inland waterway on coast of Texas.
Galveston, Tex.. ..do....	.....do....	3,500.00	3,500.00	Good..	797.20	Improving Houston Ship Channel.
.....do....	.....do....	3,578.22	3,000.00	.....do....	.....	Do.
.....do....	.....do....	3,316.00	3,000.00	.....do....	.....	Improving Aransas Pass and Bay.
.....do....	.....do....	3,316.00	2,000.00	Fair...	.....	Do.
.....do....	.....do....	2,015.00	1,800.00	.....do....	.....	Inland waterway on the coast of Texas.
.....do....	.....do....	7,500.00	6,500.00	.....do....	.....	Improving harbor at Galveston, Tex.
.....do....	.....do....	8,650.00	8,600.00	Excellent.	.....	Improving Houston Ship Channel.
.....do....	.....do....	8,650.00	8,600.00	.....do....	.....	Do.

GRAND RAPIDS, MICH.

Sparrows Point, Md. ....do....	Steel..	\$177,953.00	\$145,000.00	Good..	\$4,146.21	Harbors east shore Lake Michigan.
Saginaw, Mich.. ..do....	Wood.	\$18,000.00	8,000.00	.....do....	5,518.60	Grand River, Mich., and Muskegon Harbor, Mich.
(C).....do....	.....do....	5,452.69	1,400.00	.....do....	219.18	Do.
Saugatuck, Mich. ....do....	.....do....	\$10,000.00	12,000.00	.....do....	6,890.44	Harbors east shore Lake Michigan.
.....do....	.....do....	1,600.00	600.00	.....do....	91.07	Manistee Harbor, Mich.
Grand Rapids, Mich. ....do....	.....do....	426.00	200.00	.....do....	1.28	Grand River, Mich.
.....do....	.....do....	207.28	200.00	.....do....	2.60	Harbors east shore Lake Michigan.

HONOLULU, HAWAII.

Seattle, Wash. ....do....	Wood.	\$2,800.00	\$2,000.00	Good..	.....	River and harbor works.
.....do....	.....do....	2,000.00	1,000.00	.....do....	\$53.21	Fortification works.
Honolulu, Hawaii. ....do....	.....do....	153.00	500.00	.....do....	.....	Do.
.....do....	.....do....	150.00	600.00	.....do....	310.73	Do.
.....do....	.....do....	200.00	800.00	.....do....	258.61	Do.

chased in Chicago, 1889, for \$7,500. Nothing of this boat except the boiler used when rebuilt in 1906. Extensive repairs made to hull in 1918. Chartered by terms of four-month lease, at the expiration of which the scows became the property of United States.

TABLE III.—Statement of floating plant owned by the United States Army.

JACKSONVILLE, FLA.

Name or number.	Type.	Dis- place- ment.	Dimensions.			When built.	Where built.
			Length.	Beam.	Depth.		
Barnard.....	Hydraulic pipe-line, self-propelling dredge.	Long tons. 1,291.00	Ft.in. 198 8 38	Ft.in. 0 14	0 0	1904	Camden, N. J.
Major J. C. Mallory ¹ ..	Hydraulic pipe-line dredge.	666	130 0 32	0 9	0 0	1913	Baltimore, Md.
Sarasota.....	do ²	181.40	77 2 29	6 5	0 0	1915	Tampa, Fla.
Florida.....	Hydraulic pipe-line, self- propelling dredge.	371.00	152 0 29	9 7	0 0	1904- 1905	Jacksonville, Fla.
Kissimmee.....	Snag boat.....	65.00	60 0 18	0 4	0 0	1903	Kissimmee, Fla.
Key West.....	Seagoing hopper dredge	1,000.00	142 0 31	7 14	8 0	1904	Belfast, Me.
Captain Maguire ³	Gasoline motor snag boat.	49.00	67 0 17	7 4	0 0	1897	Palatka, Fla.
Captain J. J. Meyler.....	Motor survey boat.....	43.16	70 0 15	0 7	8 0	1912	Port Clinton, Ohio
De Soto ⁴	do.....	14.00	63 2 10	7 5	1 0	1905	New York, N. Y.
D'Armit.....	do.....	4.30	35 0 8	3 4	6 0	1913	Racine, Wis.
Sirius.....	Motor launch, cabin.....	5.00	32 0 8	0 3	0 0	1911	Jacksonville, Fla.
Violetta.....	do.....	8.00	34 0 11	4 3	0 0	1892	Brooklyn, N. Y.
Corvi ⁵	Motor launch.....	.45	18 0 4	10 3	0 0	1904	Belfast, Me.
Mal ⁶	do.....	.95	18 0 5	10 2	9 0	1913	Jacksonville, Fla.
Chica ⁷	do.....	.35	19 6 5	5 3	2 0	1904	Belfast, Me.
Nassau.....	Motor launch, cabin.....	1.20	23 10 7	1 3	10 0	1916	Dames Point, Ind.
Alafia.....	Motor launch.....	.65	18 0 5	10 2	1 0	1914	South Jacksonville, Fla.
Freak.....	do.....	2.50	28 0 8	0 3	0 0	1909	Bradentown, Wis.
Welaka ⁸	do.....	.50	20 0 5	6 2	2 0	1905	Green Point, Fla.
Tocoi.....	do.....	.24	16 10 4	1 1	9 0	1913	Salem, Ohio
Hyacinth Elevator, No. 1, ⁹	Pontoon catamaran with elevator.	17.50	30 0 30	0 3	5 0	1909	Jacksonville, Fla.
Hyacinth Elevator, No. 2.....	do.....	42.00	40 0 28	0 5	0 0	1916	Dunnellon, Fla.
No. 1.....	Barge.....	51.00	66 0 22	0 6	0 0	1911	Jacksonville, Fla.
No. 2.....	do.....	51.00	66 0 22	0 6	0 0	1911	do.....
No. 3.....	Barge (water).....	50.50	65 0 22	0 6	0 0	1913	do.....
No. 4.....	Barge (fuel).....	50.50	65 0 22	0 6	0 0	1913	do.....

¹ And dredge Jacksonville. Estimated value \$20,000 in exchange.² Increase in displacement due to addition of quarters.³ Formerly steamer La Reve.⁴ Formerly motor boat Gunadmatrix.⁵ No record.⁶ Formerly lifeboat on dredge Key West.

FLOATING PLANT.

3871

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

JACKSONVILLE, FLA.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Steel	\$230,000.00	\$145,000.00	Good	\$25,611.91	Hillsboro Bay, Fla.
1913	Baltimore, Md.	do	74,000.00	82,500.00	do	30,538.73	St. Johns River, Fla.
		do	20,002.98	19,500.00	do	3,276.90	Caloosahatchee and Manatee Rivers, inland waterways of west coast of Florida.
		do	80,000.00	67,000.00	do	6,587.77	St. Johns River and tributaries, inland waterways of east coast of Florida.
		Wood	4,000.00	800.00	Poor		Caloosahatchee and Kissimmee Rivers.
1902	Palatka, Fla.	do	91,000.00	58,000.00	Good	3,997.87	St. Johns River.
		do	5,000.00	1,950.00	do	467.94	Removal of hyacinth and snags, St. Johns and Oklawaha Rivers, Fla.
		do	17,431.14	14,000.00	do	2,583.50	Inspection waterways, east coast of Florida.
1911	New York, N. Y.	do	7,500.00	5,800.00	do	345.63	Inspection Hillsboro Bay and waterways, west coast of Florida.
1913	Racine, Wis.	do	1,880.00	1,600.00	do	227.74	Inspection St. Johns River, Jacksonville to ocean; inland waterway St. Johns River to Cumberland Sound.
		do	1,450.00	1,000.00	do	281.75	Tender for dredge Florida and surveys in Indian River, Fla.
(*)	(*)	do	1,000.00	1,000.00	do	380.97	Surveys Hillsboro Bay and tender to dredge Barnard.
		do	100.00	100.00	do	13.50	Surveys in Hillsboro Bay and waterways west coast of Florida.
1913	Jacksonville, Fla.	do	534.00	10.00	Unserviceable.	107.75	Tender for U. S. dredge Major J. C. Mallory.
		do	(*)	200.00	Good	140.00	Motor tender U. S. dredge Key West.
		do	307.14	637.00	do	384.25	Surveys and examinations St. Johns River and inland waterway St. Johns River to Cumberland Sound.
1914		do	479.00	500.00	do	435.18	Tender to U. S. dredge Sarasota.
		do	530.00	225.00	Fair	35.52	Improvement Caloosahatchee and Kissimmee Rivers.
		do	(10)	10.00	Unserviceable.		St. Johns River, general improvement.
1913	Salem, Ohio.	Steel	137.00	100.00	Good		Do.
		Wood	2,250.00		Worn out.		St. Johns River and tributaries.
		do	3,799.65	3,799.65	Good		Withlacoochee River.
1912	Jacksonville, Fla.	do	800.00	800.00	do	110.00	St. Johns River.
1912	do	do	800.00	800.00	Fair		Do.
		do	1,385.00	1,650.00	Good		Do.
		do	1,393.00	1,600.00	do		Do.

* Worn out in service.

* Part of life-saving equipment of dredge Key West.

* Included in price of Key West.

* Formerly lifeboat on dredge St. Johns.

10 Dismantled; hull unserviceable.

TABLE III.—Statement of floating plant owned by the United States Army.

JACKSONVILLE, FLA.—Continued.

Name or number.	Type.	Dis- place- ment.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
No. S1.....	Barge (fuel).....	Long tons. 31.00	Ft. in. 50 0	Ft. in. 17 0	Ft. in. 5 0	1915	Tampa, Fla.
No. B2.....	Barge.....	50.50	65 0	22 0	6 0	1914	do.....
No. B3.....	do.....	50.50	65 0	22 0	6 0	1914	do.....
B4.....	do.....	50.50	65 0	22 0	6 0	1916	do.....
B5.....	do.....	31.00	50 0	17 0	5 0	1916	do.....
HB1 ¹	Barge, quarter boat.....	39.90	45 0	15 0	4 0	(?)	(?)
M5.....	Barge, derrick.....	20.20	39 0	14 0	4 0	.....	Jacksonville

KANSAS CITY, MO.

Augustin, Lieut.....	Stern-wheel towboat.....	191.00	136 0	25 6	5 0	1911	Dubuque, Mo.
Augustin, No. 1.....	Skiff.....	20 0	5 4	1 10	1911	do.....	do.....
Augustin, No. 2.....	do.....	20 0	5 4	1 10	1911	do.....	do.....
Bonne Femme ⁴	Motor launch.....	24 8	5 6	2 5	1908	do.....	Grafton, Ia.
Bon Homme.....	do.....	21 7	4 11	2 6	1916	do.....	Gasconade
Bonneville.....	Stern-wheel towboat.....	93.00	127 8	22 9	4 0	1915	Sioux City
C.....	Quarter boat.....	48.00	100 0	20 0	4 0	1915	Gasconade
Charlton.....	Motor launch.....	1.00	24 0	5 0	1 10	1914	do.....
Daniel Boone.....	Stern-wheel towboat.....	80.00	117 6	22 8	4 0	1913	do.....
Enquirer.....	Motor launch.....	30 4	7 0	3 0	1897	do.....	Long Island
Gasconade.....	Stern-wheel towboat (gasoline).....	13.00	59 2	12 6	2 6	1911	N. Y. Gasconade
Gasconade.....	Skiff.....	12 0	3 4	.....	1911	do.....	Grafton, Ia.
George G. Keith.....	Stern-wheel towboat.....	94.00	127 8	22 10	4 0	1914	Gasconade
Gurney, Lieut.....	do.....	191.00	136 0	25 6	5 0	1911	Dubuque, Mo.
Gurney, No. 1.....	Skiff.....	20 0	5 4	1 10	1911	do.....	do.....
Gurney, No. 2.....	do.....	20 0	5 4	1 10	1911	do.....	do.....
Hurricane.....	Motor launch.....	1.50	24 2	5 4	1 10	1915	Gasconade
Katherine.....	Stern-wheel survey boat (gasoline).....	55.00	86 4	22 0	3 0	1912	do.....
Katherine, No. 1.....	Skiff.....	16 0	.....	.....	1912	do.....	Grafton, Ia.
Katherine, No. 2.....	do.....	16 0	.....	.....	1912	do.....	do.....
Katherine, No. 3.....	do.....	18 0	4 6	1 3	1913	do.....	Kansas City
Lewis, Lieut.....	Stern-wheel towboat.....	191.00	136 0	25 6	5 0	1911	Dubuque, Mo.
Lewis, No. 1.....	Skiff.....	20 0	5 4	1 10	1911	do.....	do.....
Lewis, No. 2.....	do.....	20 0	5 4	1 10	1911	do.....	do.....
Mandan.....	Stern-wheel snag boat.....	150.00	156 0	24 0	4 7	1891	St. Louis
McPherson, James B.....	do.....	340.00	194 0	30 0	5 7	1891	Dubuque, Mo.
McPherson, No. 2.....	Skiff.....	20 0	4 4	1 5	1899	do.....	Stillwater
McPherson, No. 3.....	Yawl.....	26 0	6 4	1 7	1895	do.....	Jeffersonville
Missouri ⁶	Side-wheel snagboat.....	510.00	187 0	52 0	7 0	1888	Pittsburg
Missouri.....	Yawl.....	26 0	5 0	1 9	1907	do.....	New York
Monitcau.....	Motor launch.....	1.00	24 0	5 0	1 10	1914	Gasconade
Moreau.....	do.....	20 0	5 1	2 1	1910	do.....	Grafton, Ia.
Osage ⁷	Stern-wheel towboat.....	39.00	68 8	15 1	3 2	1897	Great Falls
Racket.....	Motor launch.....	1.00	22 6½	4 7	1 7	1910	Lock and
Sioux ^{8 10}	do.....	20 0	5 0	2 3	1909	do.....	Grafton, Ia.
Tomahawk.....	do.....	22 6½	5 6	2 4	1915	do.....	Gasconade
Wakenda.....	do.....	1.00	24 0	5 0	1 10	1914	do.....
Whetstone.....	do.....	1.50	24 0	5 6	1 10	1916	do.....
Wild Horse.....	do.....	1.00	24 0	5 0	1 10	1914	do.....
Z.....	Quarter boat.....	72.03	90 0	20 0	4 0	1914	Lock and
I-EP.....	Barge.....	20.00	69 7	19 10	5 0	1899	Fort Benton
I.....	do.....	53.00	100 0	25 0	4 0	1911	Gasconade
I.....	Dredge.....	120.00	92 0	32 0	4 4	1911	Lock and
I.....	Mattress boat.....	49.00	80 0	30 0	4 0	1909	Gasconade
I-B.....	Pile driver.....	25.00	56 0	18 0	4 4	1895	Bismarck

¹ Quarters and galley built on this barge in 1915.² No record.³ Included in contract price for steel towboat.⁴ Formerly the Missouri.⁵ Built by U. S. Engineer Department.⁶ Formerly the C. R. Suiter.

and in the Engineer Department at large on Dec. 31, 1916—Continued.

KANSAS CITY, MO.—Continued.

Purchased.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Where.						
.....	Wood.	\$1,250.00	\$1,250.00	Good..	\$33.50	Hillsboro Bay, Manatee River, Caloosahatchee River, Sarasota Bay.
.....	do.	1,750.00	1,650.00	do.	93.75	Hillsboro Bay, Fla.
.....	do.	1,750.00	1,650.00	do.	93.75	Do.
.....	do.	1,938.00	1,938.00	do.	.....	Do.
.....	do.	1,390.00	1,390.00	do.	.....	Do.
Quart, Fla.	do.	125.00	100.00	do.	.....	Do.
Jacksonville, Fla.	do.	500.00	500.00	do.	.....	St. Johns River, Fla.

KANSAS CITY, MO.

ubuque, Iowa.	Steel..	\$34,888.70	\$24,224.00	Fair..	\$1,553.37	Lower Missouri River.
do.	do.	(⁷)	41.50	do.	.....	Do.
do.	do.	(⁷)	41.50	do.	.....	Do.
rafton, Ill.	do.	484.00	200.00	do.	67.93	Do.
do.	Wood.	241.43	200.00	Good..	30.42	Do.
do.	do.	17,933.89	12,762.52	do.	765.16	Upper Missouri River.
do.	do.	3,852.46	3,490.03	Fair..	.....	Gasconade River.
do.	do.	286.62	225.00	do.	214.83	Lower Missouri River.
do.	do.	12,103.47	9,900.00	do.	335.38	Do.
ong Island City, N. Y.	do.	2,300.00	270.00	do.	9.30	Osage River.
do.	do.	2,675.00	1,500.00	do.	120.05	Lower Missouri River.
rafton, Ill.	Steel..	22.00	15.00	do.	.....	Gasconade River.
do.	Wood.	14,871.50	12,600.00	do.	832.01	Lower Missouri River.
ubuque, Iowa.	Steel..	34,888.70	24,300.00	Good..	1,156.49	Do.
do.	do.	(⁸)	25.00	do.	3.36	Do.
do.	do.	(⁸)	25.00	do.	6.20	Do.
do.	Wood.	269.10	250.00	do.	182.67	Do.
do.	do.	8,363.44	6,750.00	do.	1,062.13	Do.
rafton, Ill.	Steel..	45.00	30.00	do.	.....	Do.
do.	do.	45.00	30.00	do.	.....	Do.
ansas City, Mo.	Wood.	18.00	.....	Bad..	.....	Do.
ubuque, Iowa.	Steel..	34,888.70	24,300.00	Good..	1,363.38	Do.
do.	do.	(⁹)	15.00	Fair..	7.98	Do.
do.	do.	(⁹)	30.00	Good..	7.98	Do.
t. Louis, Mo.	do.	21,500.00	13,081.61	do.	571.36	Upper Missouri River.
ubuque, Iowa.	do.	45,500.00	26,193.88	Fair..	1,709.63	Do.
illwater, Minn.	Wood.	42.00	18.00	do.	.....	Do.
Jeffersonville, Ind.	Steel..	160.00	36.00	Good..	.....	Do.
Pittsburgh, Pa.	do.	115,000.00	86,500.00	do.	4,413.66	Lower Missouri River.
ew York, N. Y.	Steel..	251.00	140.00	do.	7.98	Do.
do.	Wood.	286.62	225.00	do.	22.57	Do.
rafton, Ill.	Steel..	388.50	225.00	do.	.....	Upper Missouri River.
do.	Wood.	2,500.00	2,000.00	Poor..	43.35	Osage River.
do.	do.	\$200.00	180.00	Good..	8.19	Do.
rafton, Ill.	Steel..	387.00	75.00	Poor..	.....	Upper Missouri River.
do.	Wood.	\$84.20	225.00	Fair..	.....	Lower Missouri River.
do.	do.	286.62	225.00	Good..	39.90	Do.
do.	do.	378.08	378.00	do.	18.96	Do.
do.	do.	286.62	225.00	do.	54.90	Do.
do.	do.	3,254.68	2,700.00	do.	21.06	Osage River.
do.	do.	840.00	180.00	Poor..	.....	Upper Missouri River.
do.	do.	2,300.00	1,700.00	Good..	.....	Gasconade River.
do.	do.	4,590.00	3,330.00	Fair..	104.06	Osage River.
do.	do.	1,974.42	1,800.00	Good..	1,460.74	Lower Missouri River.
do.	do.	2,500.00	900.00	Poor..	.....	Upper Missouri River.

⁷ Formerly the H. M. Roberts.
⁸ Estimated.

⁹ Recovered as salvage.
¹⁰ Formerly the McPherson.

TABLE III.—Statement of floating plant owned by the United States and
KANSAS CITY, MO—Continued.

Name or number.	Type.	Dis- place- ment.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
		Long tons.	ft. in.	ft. in.	ft. in.		
1.....	Pile driver.....	61.00	76 0	19 0	4 4	1909	Gasconade, Mo.....
1.....	Power boat.....	36.00	70 0	18 0	4 0	1897	.....do.....
1.....	Quarter boat.....	54.00	100 0	20 0	5 0	⁽¹⁾ 1910	Rock Island, Ill.....
1.....	Skiff.....	20 0	5 6	2 0	1913	.....do.....	Gasconade, Mo. ²
I-B.....	do.....	18 0	4 4	1 7	1895	.....do.....	Stillwater, Minn.....
II-EP.....	Barge.....	25.00	70 0	20 0	5 0	1899	Fort Benton, Mont.....
2.....	Mattress barge.....	40.00	80 0	30 0	4 0	1909	Gasconade, Mo.....
2.....	Quarter boat.....	54.00	100 0	20 0	5 0	⁽¹⁾ 1910	Rock Island, Ill. ³
2.....	Skiff.....	19 10	2 11 ¹	1 6	(⁴)	⁽¹⁾ 1912	Gasconade, Mo. ³
III-S.....	Barge, flat bottom.....	44.00	70 0	20 0	5 0	1897	Lock and Dam No. 1
3.....	do.....	10.00	42 0	14 0	3 0	1905	(Osage River).
3.....	Mattress boat.....	49.00	80 0	30 0	4 0	1912	Sloux City, Iowa
3.....	Quarter boat.....	54.00	100 0	20 0	5 0	⁽¹⁾ 1910	Lock and Dam No.
3.....	Pile driver.....	63.00	76 0	19 0	4 4	⁽¹⁾ 1912	1 (Osage River).
3.....	Skiff.....	16 1	2 7	1 4	(⁵)	.....do.....	Gasconade, Mo.....
IV-S.....	Barge (piledriver on it).....	65.00	65 0	19 0	4 6	1897	Gasconade, Mo.....
IV-EP.....	Barge (grinder on it).....	50.00	70 0	19 10	5 0	1899	Rock Island, Ill.....
4.....	Barge.....	31.00	72 0	20 0	4 0	1905	Gasconade, Mo.....
4.....	Mattress boat.....	49.00	80 0	30 0	4 0	1912	Osage River
4.....	Pile driver.....	63.00	76 0	19 0	4 4	1914	Gasconade River
4.....	Quarter boat.....	72.00	90 0	20 0	5 0	1914	.....do.....
4.....	Skiff.....	16 2	2 6	1 4	(⁶)	.....do.....	Lock and Dam No.
V-Y.....	Barge.....	64 0	16 0	3 0	1899	1 (Osage River).	Sloux City, Iowa
5.....	Mattress boat.....	40.00	80 0	30 0	4 0	1914	Gasconade, Mo.....
5.....	Pile driver.....	56.00	76 0	19 0	4 6	1914	.....do.....
5.....	Quarter boat.....	72.00	90 0	20 0	5 0	1914	.....do.....
5.....	Skiff.....	18 0	2 10	1 4	1915	Lock and Dam No.	1 (Osage River).
6.....	Barge.....	72 0	20 0	4 0	1909	.....do.....	Gasconade, Mo.....
6.....	Mattress boat.....	49.00	80 0	30 0	4 0	1914	.....do.....
6.....	Pile driver.....	56.00	76 0	19 0	4 6	1914	.....do.....
6.....	Pontoon.....	8.00	32 0	8 0	3 0	1914	.....do.....
6.....	Quarter boat.....	84.00	100 0	20 0	5 0	1914	.....do.....
6.....	Skiff.....	18 9	4 6	1 3	1915	.....do.....	do.....
VII-P.....	Barge.....	30.00	70 0	20 0	4 4	1897	Pierre, Dak.....
VII-Y.....	Pile river ¹²	91.00	76 0	19 0	4 4	1912	Sloux City, Iowa
7.....	Mattress barge.....	49.00	80 0	30 0	4 0	1914	Gasconade, Mo.....
7.....	Quarter boat.....	84.00	100 0	20 0	5 0	1914	.....do.....
7.....	Skiff.....	20 0	4 6	1 3	1915	.....do.....	do.....
8.....	Quarter boat.....	84.00	100 0	20 0	5 0	1914	.....do.....
8.....	Skiff.....	19 0	4 8	1 3	1914	.....do.....	do.....
IX-B.....	Barge.....	35.00	80 0	20 0	4 0	(¹²)	(¹²)
9.....	Quarter boat.....	50.00	100 0	20 0	4 0	1915	Gasconade, Mo.....
X-B.....	Barge.....	33.00	80 0	20 0	4 0	(¹³)	(¹³)
10.....	Skiff.....	22 0	5 1	1 3	1914	Gasconade, Mo.....	Gasconade, Mo.....
11.....	do.....	20 0	4 7	1 3	1914	.....do.....	do.....
12.....	Pontoon.....	2.00	19 6	8 0	2 0	1909	.....do.....
12.....	Skiff.....	20 0	4 7	1 3	1914	.....do.....	do.....
13.....	Pontoon.....	2.00	19 6	8 0	2 0	1909	.....do.....
13.....	Skiff.....	16 0	3 9	1 2	1914	.....do.....	do.....
14 ¹⁴	Mattress boat.....	49.00	80 0	30 0	4 0	1894	.....do.....
14.....	Skiff.....	16 0	3 9	1 2	1914	.....do.....	do.....
15.....	{ Pile driver ¹⁷	86.00	76 0	19 0	4 4	1893	St. Louis, Mo.....
15.....	Pontoon.....	2.00	20 0	7 0	3 0	1914	Gasconade, Mo.....
16.....	do.....	2.00	20 0	7 0	3 0	1914	.....do.....

¹ Built by the U. S. Engineer Department.² Hull.³ Quarters.⁴ No record.⁵ Rebuilt 1913.⁶ First cost revised.

the Engineer Department at large on Dec. 31, 1916—Continued.

KANSAS CITY, MO.—Continued.

Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
.....	Wood.	\$1,500.00	750.00	Poor..	299.45	Upper Missouri River.
.....	do.	3,000.00	1,800.00	Good..	.....	Gasconade River.
Island, Ill.	do.	\$1,500.00	2,250.00	Fair...	392.87	Lower Missouri River.
.....	do.	\$2,900.00	.....	.....	.....	Do.
.....	(¹)	45.00	15.00	Good..	7.98	Upper Missouri River.
Water, Minn.	do.	45.00	15.00	do.	.....	Do.
.....	do.	840.00	180.00	do.	.....	Do.
.....	do.	1,974.42	180.00	do.	.....	Do.
Island, Ill.	do.	\$1,500.00	3,600.00	Good..	88.77	Lower Missouri River.
Gasconade, Mo.	do.	\$3,783.00	.....	.....	.....	Osage River.
.....	do.	(¹)	15.00	Fair..	.....	.....
.....	do.	625.00	1,075.00	Good..	58.20	Lower Missouri River.
.....	do.	937.00	450.00	Fair..	8.70	Osage River.
.....	do.	\$2,097.03	1,250.00	do.	2.67	Lower Missouri River.
Island, Ill.	do.	\$1,500.00	4,000.00	Good..	159.47	Do.
.....	do.	\$3,959.60	.....	.....	.....	Do.
.....	do.	3,023.07	2,500.00	Good..	301.89	Do.
.....	do.	(²)	6.00	Poor..	.....	Osage River.
.....	do.	\$625.00	500.00	do.	.....	Upper Missouri River.
.....	do.	\$840.00	2,500.00	Good..	191.72	Lower Missouri River.
.....	do.	97.00	1,060.00	Fair..	4.75	Osage River.
.....	do.	\$1,746.95	1,250.00	do.	.....	Lower Missouri River.
.....	do.	3,069.50	2,500.00	Good..	50.69	Do.
.....	do.	4,084.12	4,000.00	do.	20.18	Do.
.....	do.	(³)	20.00	do.	.....	Osage River.
.....	do.	840.00	180.00	Poor..	.....	Upper Missouri River.
.....	do.	2,110.64	1,800.00	Good..	14.45	Lower Missouri River.
.....	do.	5,531.91	4,500.00	do.	.....	Do.
.....	do.	3,097.45	3,450.00	Fair..	385.00	Do.
.....	do.	37.68	30.00	Good..	24.50	Osage River.
.....	do.	\$1,200.00	100.00	Poor..	34.10	Do.
.....	do.	2,105.91	1,000.00	Good..	.....	Lower Missouri River.
.....	do.	5,668.74	4,500.00	Fair..	136.79	Do.
.....	do.	114.85	90.00	Good..	13.32	Do.
.....	do.	6,791.98	5,400.00	do.	.....	Do.
.....	do.	(⁴)	15.00	Poor..	7.98	Do.
.....	do.	720.00	180.00	do.	.....	Upper Missouri River.
.....	do.	2,690.00	1,350.00	do.	290.92	Lower Missouri River.
.....	do.	2,094.85	1,710.00	Fair..	85.60	Do.
.....	do.	6,958.78	5,400.00	Good..	791.13	Do.
.....	do.	(⁵)	25.00	Fair..	.....	Do.
.....	do.	7,043.68	5,040.00	Good..	94.92	Do.
.....	do.	(⁶)	20.00	Fair..	7.98	Do.
Ark, N. Dak.	do.	572.00	180.00	Poor..	.....	Upper Missouri River.
.....	do.	4,167.49	3,600.00	Good..	.....	Lower Missouri River.
Ark, N. Dak.	do.	532.00	180.00	Poor..	.....	Upper Missouri River.
.....	do.	(⁷)	25.00	Fair..	7.98	Lower Missouri River.
.....	do.	45.00	30.00	Good..	.....	Do.
.....	do.	74.00	30.00	Fair..	13.33	Do.
.....	do.	45.09	15.00	Poor..	7.98	Do.
.....	do.	74.00	20.00	Fair..	7.52	Do.
.....	do.	38.27	25.00	Good..	.....	Do.
.....	do.	{ 1,200.00 }	1,200.00	do.	132.25	Do.
.....	do.	{ 1,922.45 }	30.00	do.	7.98	Do.
.....	do.	{ 1,980.00 }	1,500.00	do.	158.81	Do.
ouis, Mo.	do.	{ 2,000.00 }	20.00	Poor..	.....	Do.
.....	do.	107.41	50.00	do.	.....	Do.
.....	do.	107.41	.....	.....	.....	Do.

Estimated value of hull and machinery.

including machinery.

the driver and grader combined.

built at Gasconade, Mo., 1913.

¹¹ Dimensions increased when rebuilt.

¹² Cost of hull.

¹³ Cost of old machinery used.

¹⁴ Both hull and machinery.

TABLE III.—Statement of floating plant owned by the United States Army.

KANSAS CITY, MO.—Continued.

Name or number.	Type.	Dis- place- ment.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
		<i>Long tons.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>		
17.....	Pontoon.....	2.00	20 0	7 0	3 0	1914	Gasconade,
18.....	do.....	2.00	20 0	7 0	3 0	1914	do.....
19.....	do.....	2.00	20 0	7 0	3 0	1914	do.....
20.....	do.....	2.00	20 0	7 0	3 0	1914	do.....
21.....	do.....	2.00	20 0	7 0	3 0	1914	do.....
22.....	do.....	2.00	20 0	7 0	3 0	1914	do.....
23.....	do.....	1.50	20 0	5 4	1 0	1914	Sioux City
24.....	do.....	1.50	20 0	5 4	1 0	1914	do.....
25.....	Pile driver.....	75.00	68 0	20 0	3 1	1893	St. Louis,
26.....	Pontoon.....	2.00	20 10	7 0	3 0	1914	Gasconade
27.....	do.....	2.00	20 10	7 0	3 0	1914	do.....
28.....	do.....	2.00	20 10	7 0	3 0	1914	do.....
29.....	do.....	2.00	20 10	7 0	3 0	1914	do.....
30.....	do.....	1.50	22 0	7 0	3 0	1916	do.....
31.....	do.....	1.50	22 0	7 0	3 0	1916	do.....
32.....	do.....	1.50	22 0	7 0	3 0	1916	do.....
33.....	do.....	1.50	22 0	7 0	3 0	1916	do.....
34.....	do.....	1.50	22 0	7 0	3 0	1916	do.....
35.....	Pile driver.....	75.00	68 0	20 0	3 1	1893	St. Louis,
36.....	Pontoon.....	1.50	19 6	7 0	2 10	1916	Gasconade
37.....	do.....	1.50	19 6	7 0	2 10	1916	do.....
38.....	do.....	1.50	25 6	6 6	2 2	1916	Glasgow,
39.....	do.....	1.67	30 0	6 6	2 9	1916	Lupus, Mo.
40.....	do.....	1.50	22 0	7 0	3 0	1916	Gasconade
41.....	do.....	1.50	22 0	7 0	3 0	1916	Lupus, Mo.
42.....	do.....	1.00	18 0	8 0	1 4	1916	Freeburg,
43.....	Skiff.....	20 0	4 4	1 6	1 6	1909	Gasconade
44.....	do.....	20 0	4 4	1 6	1 6	1909	do.....
45.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
46.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
47.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
48.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
49.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
50.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
51.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
52.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
53.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
54.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
55.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
56.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
57.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
58.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
59.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
60.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
61.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
62.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
63.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
64.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
65.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
66.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
67.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
68.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
69.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
70.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
71.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
72.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
73.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
74.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
75.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
76.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
77.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
78.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
79.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
80.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
81.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
82.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
83.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
84.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
85.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
86.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
87.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
88.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
89.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
90.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
91.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
92.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
93.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
94.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
95.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
96.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
97.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
98.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
99.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
100.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
101.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
102.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
103.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
104.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
105.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
106.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
107.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
108.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
109.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
110.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
111.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
112.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
113.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
114.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
115.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
116.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
117.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
118.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
119.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
120.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
121.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
122.....	do.....	20 0	5 0	1 6	1 6	1914	do.....
123.....	do.....	20 0	5 0	1 6	1 6	1914	do.....

¹ Built by the U. S. Engineer Department.

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

KANSAS CITY, MO.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
1893	St. Louis, Mo.	Wood.	\$107.41	\$50.00	Fair...		Lower Missouri River.
		do.	107.41	40.00	do.		Do.
		do.	107.41	50.00	do.	25.00	Do.
		do.	107.41	50.00	Good.	13.32	Do.
		do.	107.41	40.00	Fair.		Do.
		do.	107.41	60.00	Good.	13.33	Do.
		do.	(²)	36.00	Fair.		Upper Missouri River.
		do.	(²)	36.00	do.		Do.
		do.	3,590.00	2,000.00	Good.		Lower Missouri River.
		do.	75.15	55.00	do.	7.52	Do.
		do.	75.15	50.00	do.	13.32	Do.
		do.	75.15	50.00	Fair.	30.00	Do.
		do.	75.15	40.00	do.		Do.
		do.	80.44	70.00	Good.	13.33	Do.
1916	Freeburg, Mo.	do.	80.44	70.00	do.	13.32	Do.
		do.	80.44	70.00	do.	13.33	Do.
		do.	3,590.00	2,000.00	do.		Do.
		do.	(²)	50.00	do.		Do.
		do.	(²)	50.00	do.		Do.
		do.	(²)	60.00	Fair.		Do.
		do.	(²)	50.00	do.	31.32	Do.
		do.	(²)	60.00	Good.	13.32	Do.
		do.	(²)	20.00	Fair.	7.52	Do.
		do.	35.00	10.00	do.	13.33	Do.
		do.	35.00	15.00	Poor.	4.26	Do.
		do.	35.00	15.00	do.		Upper Missouri River.
		do.	48.49	40.00	Fair.	7.98	Lower Missouri River.
		do.	48.49	25.00	do.	12.00	Do.
1910	Stillwater, Minn.	do.	48.49	40.00	do.	7.98	Do.
		do.	48.49	35.00	do.	7.98	Do.
		do.	48.49	30.00	do.	7.98	Do.
		do.	48.49	25.00	do.	13.25	Do.
		do.	38.79	25.00	do.	4.00	Do.
		do.	38.79	25.00	Good.		Do.
		do.	48.49	15.00	Fair.		Do.
		do.	48.49	15.00	do.		Do.
		do.	38.79	40.00	Good.	7.98	Do.
		do.	48.49	40.00	do.	7.98	Do.
		do.	38.79	20.00	Fair.	7.98	Do.
		do.	38.79	10.00	Poor.	7.82	Do.
		do.	38.79	35.00	Good.		Do.
		do.	48.49	40.00	do.	7.98	Do.
		do.	45.09	25.00	Fair.	15.69	Do.
		do.	45.09	30.00	Good.		Do.
		do.	45.09	15.00	do.		Do.
		do.	45.09	40.00	do.	7.98	Do.
		do.	38.27	30.00	do.	7.98	Do.
		do.	28.00	30.00	do.	7.98	Do.
		do.	15.00	13.50	Fair.	14.00	Upper Missouri River.
		do.	65.00	33.75	do.	6.75	Do.
		do.	65.00	33.75	do.		Do.
		do.	65.00	33.75	do.	8.00	Do.
		do.	65.00	33.75	do.	8.00	Do.
		do.	65.00	0.00	Poor.		Lower Missouri River.
		do.	65.00	15.00	do.	3.50	Upper Missouri River.
		do.	65.00	15.00	do.		Lower Missouri River.
		do.	65.00	15.00	do.	7.85	Upper Missouri River.
		do.	(²)	45.00	Good.	17.10	Do.
		do.	(²)	20.00	do.	12.00	Do.
		do.	(²)	45.00	do.	7.35	Do.
		do.	(²)	15.00	Poor.	2.00	Do.
		do.	(²)	15.00	do.		Do.
		do.	(²)	15.00	do.	2.00	Do.
		do.	(²)	20.00	Fair.	7.98	Lower Missouri River.
		do.	28.87	15.00	Good.		Gasconade River.
		do.	38.16	37.00	do.		Osage River.
		do.	(²)	25.00	do.	7.98	Lower Missouri River.
		do.	(²)	25.00	do.	7.98	Do.
		do.	(²)	10.00	Fair.	7.98	Do.

² No record.

² Both hull and machinery.

TABLE III.—Statement of floating plant owned by the United States and
KANSAS CITY, MO.—Continued.

Name or number.	Type.	Dis- place- ment.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		Where.
		<i>Long tons.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>		
142.....	Barge	53.00	100 0	24 0	5 0	1890	Gasconade, Mo.....
145.....	do.	57.00	100 0	25 0	5 4	1900	do.....
147.....	do.	57.00	100 0	25 0	5 4	1900	do.....
148.....	do.	57.00	100 0	25 0	5 4	1900	do.....
149.....	do.	53.00	100 0	24 0	5 0	1900	do.....
153.....	do.	50.00	100 0	24 0	5 4	1910	Rock Island, Ill.....
154.....	do.	50.00	100 2	020 0	5 0	1910	do.....
155.....	do.	50.00	100 0	24 0	5 0	1910	do.....
156.....	do.	50.00	100 0	24 0	5 0	1910	do.....
161.....	do.	47.00	100 0	24 0	5 0	1915	Gasconade, Mo.....
162.....	do.	47.00	100 0	24 0	5 0	1915	do.....
163.....	do.	47.00	100 0	24 0	5 0	1915	do.....
164.....	do.	47.00	100 0	24 0	5 0	1915	do.....
165.....	do.	47.00	100 0	24 0	5 0	1915	do.....
166.....	do.	47.00	100 0	24 0	5 0	1915	do.....
167.....	do.	47.00	100 0	24 0	5 0	1915	do.....
168.....	do.	47.00	100 0	24 0	5 0	1915	do.....
300.....	do.	58.00	100 0	24 0	5 0	1912	Leavenworth, Kans.
301.....	do.	58.00	100 0	24 0	5 0	1912	do.....
302.....	do.	58.00	100 0	24 0	5 0	1912	do.....
303.....	do.	58.00	100 0	24 0	5 0	1912	do.....
374.....	do.	58.00	100 0	24 0	5 0	1912	do.....
375.....	do.	58.00	100 0	24 0	5 0	1912	do.....
376.....	do.	58.00	100 0	24 0	5 0	1912	do.....
377.....	do.	58.00	100 0	24 0	5 0	1912	do.....
378.....	do.	58.00	100 0	24 0	5 0	1914	Green Bay, Wis.....
309.....	do.	58.00	100 0	24 0	5 0	1914	do.....
310.....	do.	58.00	100 0	24 0	5 0	1914	do.....
311.....	do.	58.00	100 0	24 0	5 0	1914	do.....
312.....	do.	58.00	100 0	24 0	5 0	1914	do.....
313.....	do.	58.00	100 0	24 0	5 0	1914	do.....
314.....	do.	58.00	100 0	24 0	5 0	1914	do.....
315.....	do.	58.00	100 0	24 0	5 0	1914	do.....
316.....	do.	58.00	100 0	24 0	5 0	1914	Dubuque, Iowa.....
317.....	do.	58.00	100 0	24 0	5 0	1914	do.....
318.....	do.	58.00	100 0	24 0	5 0	1914	do.....
319.....	do.	58.00	100 0	24 0	5 0	1914	do.....
320.....	do.	58.00	100 0	24 0	5 0	1914	do.....
321.....	do.	58.00	100 0	24 0	5 0	1914	do.....
322.....	do.	58.00	100 0	24 0	5 0	1914	do.....
323.....	do.	58.00	100 0	24 0	5 0	1914	do.....
324.....	do.	58.00	100 0	24 0	5 0	1914	Gasconade, Mo.....
325.....	do.	58.00	100 0	24 0	5 0	1914	do.....
326.....	do.	58.00	100 0	24 0	5 0	1914	do.....
327.....	do.	58.00	100 0	24 0	5 0	1914	do.....
328.....	do.	58.00	100 0	24 0	5 0	1914	do.....
329.....	do.	58.00	100 0	24 0	5 0	1914	do.....
501.....	Quarter boat		100 0	20 0	5 0	1910	Rock Island, Ill.....
551.....	Pile driver	60.00	76 0	19 0	4 4	1913	Sioux City, Iowa.....
602.....	Barge	50.00	100 0	25 0	5 0	1913	do.....
604.....	do.	50.00	100 0	25 0	5 0	1913	do.....
605.....	do.	50.00	100 0	25 0	5 0	1913	do.....
606.....	do.	50.00	100 0	25 0	5 0	1913	do.....
607.....	do.	50.00	100 0	25 0	5 0	1913	do.....
608.....	do.	50.00	100 0	25 0	5 0	1913	do.....
609.....	do.	50.00	100 0	25 0	5 0	1913	do.....
611.....	do.	50.00	100 0	25 0	5 0	1913	do.....
612.....	do.	50.00	100 0	25 0	5 0	1913	do.....
613.....	do.	50.00	100 0	25 0	5 0	1914	do.....
614.....	do.	50.00	100 0	25 0	5 0	1914	do.....
615.....	do.	50.00	100 0	25 0	5 0	1914	do.....
616.....	do.	50.00	100 0	25 0	5 0	1914	do.....
617.....	do.	50.00	100 0	25 0	5 0	1914	do.....
618.....	do.	50.00	100 0	25 0	5 0	1914	do.....

¹ Rebuilt 1913.

² Built by the U. S. Engineer Department.

³ Beam increased.

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

KANSAS CITY, MO.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging
When.	Where.						
(1)	(2)	Wood.	\$2,815.00	\$2,100.00	Good		Lower Missouri River.
	(2)	do.	2,815.00	2,150.00	do.		Do.
	(2)	do.	2,815.00	2,250.00	do.	16.90	Do.
	(2)	do.	2,815.00		(9)		Upper Missouri River.
(1)	(2)	do.	2,815.00	2,025.00	Fair		Lower Missouri River.
1910	Rock Island, Ill.	do.	1,500.00	900.00	Good	4.78	Do.
1910	do.	do.	1,500.00	697.50	Fair		Upper Missouri River.
1910	do.	do.	1,500.00	900.00	do.		Lower Missouri River.
1910	do.	do.	1,500.00	900.00	Good	1.35	Do.
	(1)	do.	2,478.39	2,150.00	do.	.88	Do.
	(2)	do.	2,478.39	2,150.00	do.	272.90	Do.
	(2)	do.	2,478.39	2,150.00	do.	15.96	Do.
	(2)	do.	2,478.39	2,150.00	do.		Do.
	(2)	do.	2,478.39	2,150.00	do.	16.37	Do.
	(2)	do.	2,478.39	2,150.00	do.	38.93	Do.
	(2)	do.	2,478.39	2,150.00	do.	1.70	Do.
	(2)	do.	2,478.39	2,100.00	do.		Do.
1912	Leavenworth, Kans.	Steel	4,975.82	3,900.00	do.	59.98	Do.
1912	do.	do.	4,975.82	3,900.00	do.	59.98	Do.
1912	do.	do.	4,975.82	4,200.00	do.	309.39	Do.
1912	do.	do.	4,975.82	4,000.00	do.		Do.
1912	do.	do.	4,975.82	4,200.00	do.	391.16	Do.
1912	do.	do.	4,975.82	4,200.00	do.	273.97	Do.
1912	do.	do.	4,975.82	4,000.00	do.		Do.
1914	Green Bay, Wis.	do.	7,317.32	5,000.00	do.		Do.
1914	do.	do.	7,317.32	6,300.00	do.	47.25	Do.
1914	do.	do.	7,317.32	6,650.00	do.	203.15	Do.
1914	do.	do.	7,317.32	6,300.00	do.	47.25	Do.
1914	do.	do.	7,317.32	6,650.00	do.	221.10	Do.
1914	do.	do.	7,317.32	8,000.00	do.		Do.
1914	do.	do.	7,317.32	8,000.00	do.		Do.
1914	do.	do.	7,317.32	8,000.00	do.		Do.
1914	Dubuque, Iowa.	do.	6,651.06	5,000.00	do.		Do.
1914	do.	do.	6,651.06	5,800.00	do.		Do.
1914	do.	do.	6,651.06	6,100.00	do.		Do.
1914	do.	do.	6,651.06	4,500.00	Fair		Do.
1914	do.	do.	6,651.06	5,800.00	do.		Do.
1914	do.	do.	6,651.06	8,760.00	Good	59.98	Do.
1914	do.	do.	6,651.06	8,760.00	do.		Do.
1914	do.	do.	6,651.06	6,175.00	do.	14.12	Do.
1914	(2)	do.	5,792.65	5,225.00	do.	237.35	Do.
	(2)	do.	5,792.65	8,000.00	do.		Do.
	(2)	do.	5,792.65	5,000.00	do.	185.32	Do.
	(2)	do.	5,792.65	5,225.00	do.	1.70	Do.
	(2)	do.	5,792.65	8,225.00	do.	202.08	Do.
	(2)	do.	5,792.65	8,000.00	do.		Do.
1910	Rock Island, Ill.	Wood	1,600.00				Do.
1912	do.	do.	5,690.00	4,000.00	do.	604.56	Do.
	(2)	Wood.	5,892.00	3,600.00	do.	88.74	Upper Missouri River.
	(2)	do.	2,445.00	1,800.00	do.		Do.
	(2)	do.	2,292.00	1,800.00	do.		Do.
	(2)	do.	3,099.00	2,700.00	do.		Do.
	(2)	do.	3,099.00	2,700.00	do.		Do.
	(2)	do.	3,099.00	2,700.00	do.		Do.
	(2)	do.	3,099.00	2,700.00	do.		Do.
	(2)	do.	3,099.00	2,700.00	do.	10.00	Do.
	(2)	do.	3,099.00	2,700.00	do.		Do.
	(2)	do.	3,099.00	2,700.00	do.		Do.
	(2)	do.	2,692.10	2,340.00	do.		Do.
	(2)	do.	2,712.13	2,340.00	do.		Do.
	(2)	do.	2,646.30	2,340.00	do.		Do.
	(2)	do.	2,837.64	2,340.00	do.		Do.
	(2)	do.	2,828.90	2,340.00	do.		Do.
	(2)	do.	2,890.24	2,340.00	do.		Lower Missouri River.

* Hull.

* Quarters.

* Unserviceable.

TABLE III.—Statement of floating plant owned by the United States

LITTLE ROCK, ARK.

Name or number.	Type.	Dis- place- ment.	Dimensions.				Built.	
			Length.	Breadth.	Depth.	When.	Where.	
		<i>Long tons.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>			
Dredge No. 68 ¹	Dipper dredge.....	230.00	102 6	30 6	5 4	1912	Batesville, Ark.	
Reese, C. B.	Snaag boat.....	340.00	195 9	36 0	5 4	1879	Carondelet, Mo.	
Arkansas.....	do.....	235.00	155 6	30 0	4 6	1900	Jeffersonville, Ind.	
Quapaw.....	do.....	240.00	147 6	30 0	4 4	1915	Batesville, Ark.	
Johnson, A. B.	do.....	60.00	84 0	22 0	3 0	1913	Madison, Ark.	
Riverside.....	do.....	57.00	84 0	22 0	3 0	1913	Poplar Bluff, Mo.	
Allen, A. D.	Steam towboat.....	150.00	137 10	25 6	4 0	1914	Batesville, Ark.	
Quarter boat No. 1.....	Quarter boat.....	104.00	100 0	20 0	4 0	1908	do.	
Inspector No. 1.....	Gasoline launch.....	3.00	25 0	4 6	2 0	1908	Grafton, Ill.	
Barge 7-07.....	Decked scow (170-ton).....	100.00	20 0	20 0	5 0	1907	Batesville, Ark.	
Barge 9-07.....	do.....	100.00	20 0	20 0	5 0	1907	do.	
Barge 10-07.....	do.....	100.00	20 0	20 0	5 0	1907	do.	
Barge 12-13.....	do.....	100.00	20 0	20 0	5 0	1913	do.	
Barge 13-15.....	do.....	100.00	20 0	20 0	5 0	1915	do.	
Barge B1-14.....	Decked scow (200-ton).....	100.00	26 0	5 0	1914	do.		
Barge B2-14.....	do.....	100.00	26 0	5 0	1914	do.		
Barge B3-14.....	do.....	100.00	26 0	5 0	1914	do.		
Barge B4-14.....	do.....	100.00	26 0	5 0	1914	do.		
Barge D. S. No. 1.....	Hopper top scow (150-ton).....	100.00	20 0	5 0	1913	do.		
Barge D. S. No. 2.....	do.....	100.00	20 0	5 0	1913	do.		
Coal flat No. 1.....	Decked scow (60-ton).....	60.00	20 0	3 0	1913	do.		
Pile sinker No. 1.....	Pile driver (water jet).....	75.00	80 0	24 0	4 0	1915	do.	
Pile sinker No. 2.....	do.....	75.00	80 0	24 0	4 0	1915	do.	
Taber, H. S.	{Hydraulic pipe-line dredge.....}	754.00	206 9	44 4	7 0	1913	Dubuque, Iowa	
McGragor, Robert.....	do.....	750.00	206 9	44 4	7 0	1913	do.	
Derrick boat No. 4.....	Derrick boat.....	82.00	67 3	30 0	4 0	1916	Batesville, Ark.	

LOS ANGELES, CAL.

San Pedro.....	20-inch hydraulic pipe-line dredge.....	834.00	140 8	40 8	10 7	1904	San Pedro, Cal.
Cerritos.....	35 horsepower gasoline launch.....	7.32	36 6	9 6	4 9	1911	do.
Pedrito.....	16 horsepower gasoline launch.....	2.20	30 0	7 0	3 4	1904	do.
No. 1.....	Work barge.....	10.00	34 6	12 0	3 6	1905	do.
No. 4.....	Derrick barge.....	9.00	29 6	10 7	3 10	1904	do.
No. 5.....	do.....	19.00	40 0	18 0	3 6	1912	do.
No. 8.....	Oil barge.....	9.00	34 9	10 0	4 6	1914	do.
No. 9.....	Water barge.....	9.00	34 9	10 0	4 6	1904	do.
No. 10.....	Pontoon.....	6.00	21 3	10 0	3 0	1914	do.
No. 12.....	do.....	6.00	21 3	10 0	3 0	1914	do.
No. 14.....	do.....	6.00	21 3	10 0	3 0	1914	do.
No. 16.....	do.....	6.00	21 3	10 0	3 0	1904	do.
No. 18.....	do.....	6.00	21 3	10 0	3 0	1904	do.
No. 20.....	do.....	6.00	21 3	10 0	3 0	1904	do.
No. 22.....	do.....	6.00	21 3	10 0	3 0	1904	do.
No. 24.....	do.....	6.00	21 3	10 0	3 0	1904	do.
No. 26.....	do.....	6.00	21 3	10 0	3 0	1914	do.
No. 28.....	do.....	6.00	21 3	10 0	3 0	1914	do.
No. 30.....	do.....	6.00	21 3	10 0	3 0	1914	do.
No. 32.....	do.....	6.00	21 3	10 0	3 0	1904	do.
No. 33.....	do.....	6.00	21 3	10 0	3 0	1915	do.
No. 34.....	do.....	6.00	21 3	10 0	3 0	1904	do.
No. 35.....	do.....	6.00	21 3	10 0	3 0	1915	do.
No. 36.....	do.....	6.00	21 3	10 0	3 0	1904	do.
No. 37.....	do.....	10.00	35 0	10 0	3 0	1912	do.

¹ Formerly Van Frank.² Crosotad yellow pine.³ Rebuilding cost plus value of machinery and upper works transferred from old hull.

3881

LITTLE ROCK, ARK.

Purchased.					Cost of repairs, additions, and rebuilding during calendar year.	
Where.	Material.	First cost.	Estimated value	Condition.		Work to which belonging.
	Wood	\$12,673.83	\$7,850.00	Good	\$1,225.23	Upper White River, Ark.
	Iron and steel.	72,325.20	16,650.00	Fair	2,554.10	Arkansas and White Rivers, Ark.
	Steel	27,138.87	6,640.00	do	910.14	Arkansas River, Ark.
	Wood.	\$15,073.02	11,765.00	do	439.62	White, Black, and Current Rivers, Ark.
	Wood	\$4,000.00	2,625.00	do	226.36	St. Francis and L'Anguille Rivers, Ark.
	Wood.	\$4,000.00	2,450.00	do	68.36	Black and Current Rivers, Ark. and Mo.
	do	\$9,500.00	7,300.00	Good	323.71	Upper White River, Ark.
	do	4,217.00	875.00	Poor	72.02	Do.
rafton, Ill.	Steel	750.00	475.00	Bad	27.32	Do.
	Wood.	1,917.00	50.00	do	do	Do.
	do	1,917.00	50.00	do	do	Do.
	do	1,917.00	50.00	do	do	Do.
	Wood	2,689.00	1,435.00	Fair	25.25	Do.
	Wood.	2,602.56	1,975.00	Good	26.67	Do.
	do	2,831.30	2,285.00	do	108.70	Arkansas River, Ark.
	do	2,831.39	2,285.00	do	108.70	Do.
	do	2,831.39	2,285.00	do	108.70	Do.
	do	2,831.30	2,285.00	do	108.70	Do.
	do	3,293.66	2,120.00	do	62.36	White and Black Rivers, Ark.
	do	3,293.66	2,120.00	do	62.37	Do.
	do	851.99	550.00	do	do	Upper White River, Ark.
	do	5,500.00	4,585.00	do	57.92	Arkansas River, Ark.
	do	5,500.00	4,585.00	do	57.92	Do.
	Steel	\$182,964.37	146,000.00	do	2,933.80	Do.
	do	\$182,964.37	156,000.00	do	1,892.08	Do.
	Wood	5,998.74	5,500.00	do	20.00	Upper White River, Ark.

[illegible]

Digitized by Google

TABLE III.—Statement of floating plant owned by the United States.

LOS ANGELES, CAL.—Continued.

Name or number.	Type.	Displacement.	Dimensions.			When.	Built.	Where.
			Length.	Beam.	Depth.			
		<i>Long tons.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>			
No. 38.....	Pontoon.....	6.00	21 3	10 0	3 0	1904		San Pedro, Cal.
No. 11.....	do.....	10.00	35 0	10 0	3 0	1904		do.....
No. 13.....	do.....	10.00	35 0	10 0	3 0	1904		do.....
No. 15.....	do.....	10.00	35 0	10 0	3 0	1904		do.....
No. 17.....	do.....	10.00	35 0	10 3	3 0	1904		do.....
No. 18.....	do.....	10.00	35 0	10 3	3 0	1904		do.....
No. 21.....	do.....	10.00	35 0	10 3	3 0	1904		do.....
No. 23.....	do.....	10.00	35 0	10 3	3 0	1904		do.....
No. 25.....	do.....	10.00	35 0	10 3	3 0	1904		do.....
No. 27.....	do.....	10.00	35 0	10 3	3 0	1904		do.....
No. 29.....	do.....	10.00	35 0	10 3	3 0	1904		do.....
No. 31.....	do.....	10.00	35 0	10 3	3 0	1904		do.....
No. 39.....	do.....	10.00	35 0	10 3	3 0	1911		do.....
No. 41.....	do.....	10.00	35 0	10 3	3 0	1911		do.....
No. 43.....	do.....	10.00	35 0	10 3	3 0	1911		do.....
No. 40.....	do.....	10.00	35 0	10 3	3 0	1912		do.....
No. 42.....	do.....	10.00	35 0	10 3	3 0	1912		do.....
No. 44.....	do.....	10.00	35 0	10 3	3 0	1912		do.....
No. 45.....	do.....	10.00	35 0	10 3	3 0	1912		do.....
No. 46.....	do.....	10.00	35 0	10 3	3 0	1912		do.....
No. 47.....	do.....	10.00	35 0	10 3	3 0	1912		do.....
No. 48.....	do.....	10.00	35 0	10 3	3 0	1912		do.....
No. 49.....	do.....	10.00	35 0	10 3	3 0	1912		do.....
No. 50.....	do.....	10.00	35 0	10 3	3 0	1912		do.....
No. 3.....	Stone barge.....	63.50	40 8	17 0	8 8	1872		do.....
No. 7.....	Water boat.....	10.00	29 8	8 8	2 0	1888		do.....
No. 1.....	Skiff.....	16 0	3 6	1 4	1905		do.....	do.....
No. 2.....	do.....	16 0	3 6	1 4	1905		do.....	do.....
No. 3.....	do.....	18 0	4 0	1 6	1905		do.....	do.....
No. 4.....	do.....	18 0	5 0	1 6	1905		do.....	do.....
No. 5.....	do.....	18 0	5 0	1 6	1905		do.....	do.....
No. 6.....	Rowboat.....	18 0	5 0	2 4				do.....
No. 7.....	do.....	13 5	5 0	1 10				do.....

LOUISVILLE, KY.

Portland.....	Hydraulic pipe-line dredge.	131.00	100 0	22 0	5 0	1914	Jeffersonville,
Shippingport.....	do.....	131.00	100 0	22 8	5 0	1914	do.....
Louisville.....	Dipper dredge.....	127.60	67 0	28 6	6 0	1886	Cincinnati, O.
Green River ¹	do.....	268.00	112 0	31 0	4 0	1896	Spottsville, K.
Nolin River.....	do.....	210.00	88 8	30 8	6 6	1915	Pittsburgh, P.
Casey.....	Combination hydraulic and bucket dredge.	163.40	86 0	28 0	6 5	1907	Louisville, Ky.
Mammoth Cave ⁴	Stern-wheel snag boat.....	284.00	141 0	32 8	5 0	1908	Jeffersonville,
No. 1, G. and B.....	Derrick boat.....	76.00	70 0	26 0	4 0	1910	Woodbury, K.
No. 2, G. and B.....	do.....	76.00	70 0	26 0	4 0	1910	do.....
No. 4, G. and B.....	do.....	120.40	90 8	26 8	5 0	1914	Jeffersonville,
O. R. No. 1.....	do.....	131.00	70 0	32 0	5 0	1914	do.....
O. R. No. 2.....	do.....	131.00	70 0	32 0	5 0	1914	do.....
O. R. No. 1.....	Pile driver.....	88.00	70 0	22 0	4 5	1914	Elizabeth, Pa.
O. R. No. 2.....	do.....	88.00	70 0	22 0	4 5	1914	do.....
O. R. No. 3.....	do.....	88.00	70 0	22 0	4 5	1914	do.....
No. 9 ²	Drill boat.....	10.00	40 0	14 0	2 8	1910	Clarington, O.
No. 10 ³	do.....	10.00	40 0	14 0	2 8	1910	do.....
No. 11 ³	do.....	10.00	40 0	14 0	2 8	1910	Louisville, Ky.
No. 1.....	Maneuver boat.....	71.50	73 7	22 5	4 9	1912	do.....
No. 2.....	do.....	71.50	73 7	22 5	4 9	1912	do.....

¹ House and machinery installed by United States.² Not including cost of machinery transferred from old boat.³ Formerly B. O. Lermond.⁴ Formerly Wm. Preston Dixon.

ed in the Engineer Department at large on Dec. 31, 1916—Continued.

LOS ANGELES, CAL.—Continued.

Purchased.					Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Where.	Material.	First cost.	Estimated value.	Condition.		
.....	Wood.	\$192.87	\$72.00	Good.		
.....do.	292.78	115.00	.....do.		
.....do.	292.78	115.00	.....do.		
.....do.	292.78	115.00	.....do.		
.....do.	292.78	115.00	Fair.		
.....do.	292.78	115.00	.....do.		
.....do.	292.78	115.00	.....do.		
.....do.	292.78	115.00	.....do.		
.....do.	192.87	72.00	.....do.		
.....do.	192.87	72.00	.....do.		
.....do.	192.87	72.00	.....do.		
.....do.	192.87	72.00	.....do.		
.....do.	295.22	189.00	Good.		
.....do.	295.22	189.00	.....do.		
.....do.	295.22	189.00	.....do.		
.....do.	302.66	202.00	.....do.		
.....do.	302.66	202.00	.....do.		
.....do.	302.66	202.00	.....do.		
.....do.	302.66	202.00	.....do.		
.....do.	302.66	202.00	.....do.		
.....do.	302.66	202.00	.....do.		
.....do.	302.66	202.00	.....do.		
.....do.	302.66	202.00	.....do.		
.....do.	302.66	202.00	.....do.		
.....do.	750.00	.....	Bad.		
.....do.	400.00	.....	.....do.		
.....do.	38.60	27.00	Fair.		
.....do.	38.60	27.00	.....do.		
.....do.	38.60	27.00	.....do.		
.....do.	38.60	27.00	.....do.		
.....do.	38.60	27.00	.....do.		
.....do.	38.60	27.00	.....do.		
.....do.	38.60	27.00	.....do.		
Wilmington, Cal.	75.00	.....	Bad.		
San Diego, Cal.	80.00	22.00	Fair.		

Dredging plant out of commission entire year. Amount expended for minor repairs and watching dredging plant, \$3,348.92

Los Angeles Harbor, Cal.

Do.

Do.

Do.

Do.

Do.

Do.

LOUISVILLE, KY.

Jeffersonville, Ind.	Steel.	\$13,331.95	\$13,331.95	Good.	\$945.19	Ohio River.
.....do.	.....	13,320.78	13,320.78	.....do.	752.89	Do.
Cincinnati, Ohio.	Iron.	25,000.00	6,000.00	Fair.	2,814.68	Louisville and Portland Canal.
.....do.	Wood.	4,093.69	800.00	Poor.	492.16	Green and Barren Rivers, Ky.
Pittsburgh, Pa.	Steel.	28,814.05	30,000.00	Good.	283.36	Do.
.....do.	Wood.	15,132.13	3,000.00	Poor.	2,745.80	Louisville and Portland Canal.
Jeffersonville, Ind.	Steel.	36,845.19	35,000.00	Good.	1,150.81	Green and Barren Rivers, Ky.
.....do.	Wood.	2,779.30	2,200.00	Fair.	988.74	Do.
.....do.	.....	2,779.30	2,300.00	.....do.	1,463.35	Do.
Jeffersonville, Ind.	Steel.	10,291.13	10,200.00	Good.	460.74	Do.
.....do.	.....	12,726.36	13,000.00	.....do.	1,597.62	Ohio River.
.....do.	.....	12,680.91	13,000.00	.....do.	1,780.57	Do.
Elizabeth, Pa.	Wood.	5,982.21	4,200.00	.....do.	446.03	Do.
.....do.	.....	5,982.21	4,200.00	.....do.	477.15	Do.
.....do.	.....	5,982.21	1,500.00	Fair.	.....	Do.
Charlottesville, Ohio.	.....	450.00	100.00	.....do.	173.75	Do.
.....do.	.....	450.00	100.00	.....do.	299.24	Do.
.....do.	.....	521.00	100.00	.....do.	280.23	Do.
.....do.	.....	7,455.02	5,000.00	Good.	481.76	Do.
.....do.	.....	7,455.03	5,000.00	.....do.	1,400.54	Do.

* Not including cost of machinery.

* Formerly No. 9, 20-ton fuel boat.

* Formerly No. 14.

* Formerly No. 15.

TABLE III.—Statement of floating plant owned by the United States and
LOUISVILLE, KY.—Continued.

Name or number.	Type.	Dis- place- ment.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
		Long tons.	Ft. in.	Ft. in.	Ft. in.		Where.
Cherokee ¹	Stern-wheel steamboat.....	278.00	142 5	27 6	5 1	1914	Jeffersonville, Ind....
Emerald.....	.....do.....	28.00	76 9	14 0	3 3	1899	Cincinnati, Ohio....
Shawnee ⁴.....	.....do.....	83.00	117 0	25 4	3 6	1909	Louisville, Ky.....
Wave Rock.....	.....do.....	28.00	65 10	14 0	2 6	1899	.....do.....
Du Brie.....	Gasoline launch.....	1.90	28 6	5 0	3 8		Unknown.....
Echo River.....	.....do.....	6.00	40 5	9 6	4 8	1911	Louisville, Ky.....
Tarascon.....	.....do.....	1.06	26 5	6 1	2 6	1915	Salem, Ohio.....
Laura.....	.....do.....	6.00	40 9	6 7	4 2	1902	Cincinnati, Ohio....
O. R. No. 1 ⁴	Machine shop.....	91.00	90 11	24 8	6 0	1908	Ambridge, Pa.....
O. R. No. 1 ⁷	Sawmill.....	138.00	124 3	30 0	4 6	1909	Louisville, Ky.....
O. R. No. 1.....	Pump boat.....	276.20	110 0	36 0	5 6	1914	Jeffersonville, Ind....
No. 1, L. P. C.....	.....do.....	45.00	60 8	16 8	4 0	1914	.....do.....
No. 2, Ohio.....	Quarter boat.....	88.00	110 0	22 0	3 6	1909	Parkersburg, W. Va.
No. 3, Ohio.....	.....do.....	88.00	110 0	22 0	3 6	1910	Louisville, Ky.....
No. 4, Ohio.....	.....do.....	88.00	110 0	22 0	3 6	1910	.....do.....
No. 5, Ohio ⁴.....	.....do.....	169.00	124 6	25 0	4 2	1914	.....do.....
No. 1, G. and B.....	100 cubic yard dump scow.....	45.00	70 0	21 0	5 6	1910	.....do.....
No. 2, G. and B.....	.....do.....	45.00	70 0	21 0	5 6	1910	.....do.....
No. 11, L. P. C.....	.....do.....	53.00	85 0	24 0	6 0	1906	Elizabeth, Pa.....
No. 12, L. P. C.....	.....do.....	53.00	85 0	24 0	6 0	1906	.....do.....
No. 13, L. P. C.....	.....do.....	53.00	85 0	24 0	6 0	1906	.....do.....
No. 14, L. P. C.....	.....do.....	53.00	85 0	24 0	6 0	1906	.....do.....
No. 15, L. P. C.....	.....do.....	53.00	85 0	24 0	6 0	1909	Louisville, Ky.....
No. 17, L. P. C.....	.....do.....	53.00	85 0	24 0	6 0	1913	.....do.....
No. 18, L. P. C.....	.....do.....	53.00	85 0	24 0	6 0	1913	.....do.....
No. 19, L. P. C.....	150 cubic yard dump scow.....	83.00	90 8	24 8	7 0	1914	Ambridge, Pa.....
No. 20, L. P. C.....	.....do.....	83.00	90 8	24 8	7 0	1914	.....do.....
No. 21, L. P. C.....	.....do.....	83.00	90 8	24 8	7 0	1915	.....do.....
No. 22, L. P. C.....	.....do.....	83.00	90 8	24 8	7 0	1915	.....do.....
No. 1, G. and B.....	150-ton barge.....	60.00	100 0	20 0	5 0	1896	Spottsville, Ky.....
No. 2, G. and B.....	.....do.....	60.00	100 0	20 0	5 0	1897	.....do.....
No. 3, G. and B.....	200-ton barge.....	73.00	100 0	22 0	6 0	1907	Louisville, Ky.....
No. 4, G. and B.....	.....do.....	73.00	100 0	22 0	6 0	1907	.....do.....
No. 12, L. P. C.....	10-ton barge.....	9.00	40 0	12 0	2 0	1904	.....do.....
No. 14, L. P. C.....	35-ton barge.....	28.00	60 0	18 0	2 4	1908	.....do.....
No. 17, L. P. C.....	200-ton barge.....	91.00	90 11	24 8	6 0	1908	Ambridge, Pa.....
No. 18, L. P. C.....	35-ton barge.....	28.00	60 0	18 0	2 4	1910	Louisville, Ky.....
No. 19, L. P. C.....	.....do.....	28.00	60 0	18 0	2 4	1910	.....do.....
O. R. No. 20.....	100-ton barge.....	38.00	70 8	22 8	4 10	1913	Jeffersonville, Ind....
O. R. No. 21.....	.....do.....	38.00	70 8	22 8	4 10	1913	.....do.....
O. R. No. 22.....	365-ton barge.....	78.00	110 8	26 8	6 6	1914	Ambridge, Pa.....
O. R. No. 23.....	.....do.....	78.00	110 8	26 8	6 6	1914	.....do.....
O. R. No. 24.....	.....do.....	78.00	110 8	26 8	6 6	1914	.....do.....
O. R. No. 25.....	.....do.....	78.00	110 8	26 8	6 6	1914	.....do.....
O. R. No. 26.....	.....do.....	78.00	110 8	26 8	6 6	1914	.....do.....
O. R. No. 27.....	.....do.....	78.00	110 8	26 8	6 6	1914	.....do.....
O. R. No. 28.....	.....do.....	78.00	110 8	26 8	6 6	1914	.....do.....
O. R. No. 29.....	.....do.....	78.00	110 8	26 8	6 6	1914	.....do.....
O. R. No. 30.....	Cement barge.....	80.00	100 8	28 8	6 6	1914	.....do.....
O. R. No. 31.....	.....do.....	80.00	100 8	28 8	6 6	1914	.....do.....

¹ Formerly Major Mackenzie.² Rebuilt, 1896 and 1914; originally built 1887.³ Not including cost of machinery transferred from old boat.⁴ Formerly Col. G. L. Gillespie.⁵ Rebuilt. Originally built 1897.⁶ Formerly barge No. 16, L. P. C.; converted into a machine-shop boat, 1914.⁷ Formerly quarter boat No. 1, Ohio; converted into a sawmill boat, 1914.

LOUISVILLE, KY.—Continued.[illegible]

¹⁸ Not including cost of house.

TABLE III.—Statement of floating plant owned by the United States

LOUISVILLE, KY.—Continued.

Name or number.	Type.	Dis- place- ment.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
No. 17 ¹	20-ton fuel boat.....	Long tons.	Fl. in.	Fl. in.	Fl. in.		
No. 18 ¹	do.....	10.00	40	0	2 8	1909	Louisville.
No. 19 ¹	do.....	10.00	40	0	2 8	1909	do.....
O. R. No. 1.....	Flat boat.....	31.00	60	0	3 9	1914	do.....
O. R. No. 2.....	do.....	31.00	60	0	3 9	1914	do.....
No. 1.....	Anchor flat.....	6.00	24	0	3 5	1914	do.....
No. 2.....	do.....	6.00	24	0	3 5	1914	do.....
No. 1.....	Pontoon.....	1.50	20	0	3 5	1914	do.....
No. 2.....	do.....	1.50	20	0	3 5	1914	do.....
No. 3.....	do.....	1.50	20	0	3 5	1914	do.....
No. 4.....	do.....	1.50	20	0	3 5	1914	do.....
No. 5.....	do.....	1.50	20	0	3 5	1914	do.....
No. 6.....	do.....	1.50	20	0	3 5	1914	do.....
No. 7.....	do.....	1.50	20	0	3 5	1914	do.....
No. 8.....	do.....	1.50	20	0	3 5	1914	do.....
No. 9.....	do.....	1.50	20	0	3 5	1914	do.....
No. 11.....	do.....	1.50	20	0	3 5	1914	do.....
No. 12.....	do.....	1.50	20	0	3 5	1914	do.....
No. 13.....	do.....	1.50	20	0	3 5	1914	do.....
No. 14.....	do.....	1.50	20	0	3 5	1914	do.....
No. 15.....	do.....	1.50	20	0	3 5	1914	do.....
No. 16.....	do.....	1.50	20	0	3 5	1914	do.....
No. 17.....	do.....	1.50	20	0	3 5	1914	do.....
No. 18.....	do.....	1.50	20	0	3 5	1914	do.....
No. 19.....	do.....	1.50	20	0	3 5	1914	do.....
No. 20.....	do.....	1.50	20	0	3 5	1914	do.....
No. 21.....	do.....	1.50	20	0	3 5	1914	do.....
No. 22.....	do.....	1.50	20	0	3 5	1914	do.....
No. 23.....	do.....	1.50	20	0	3 5	1914	do.....
No. 24.....	do.....	1.50	20	0	3 5	1914	do.....
No. 25.....	do.....	1.50	20	0	3 5	1914	do.....
No. 26.....	do.....	1.50	20	0	3 5	1914	do.....
No. 27.....	do.....	1.50	20	0	3 5	1914	do.....
No. 28.....	do.....	1.50	20	0	3 5	1914	do.....
No. 3, G. and B. ⁴	Mixer flat.....	75.00	70	0	4 0	1906	Greencastle

MANILA, P. I.

Engineer.....	Screw, steam, tug.....	298.80	108	6	20	0	11	0	1907	Hongkong
No. 1D.....	Barge, deck.....	166.00	75	6	28	8	7	0	1905	Ilolo.....
No. 4.....	do.....	215.00	75	0	26	2	7 8	0	1907	Manila.....
No. 5.....	Barge derrick.....	166.00	75	6	28	8	7	0	1905	Ilolo.....
Band dredge No. 6 ¹	do.....	103.00	58	0	20	0	8	0	1910	Corregidor
No. 8.....	Barge, deck.....	394.00	110	0	30	0	8	0	1910	Manila.....
No. 9.....	do.....	394.00	110	0	30	0	8	0	1910	do.....
No. 11.....	Barge, hold.....	394.00	110	0	30	0	8	0	1911	do.....
No. 12.....	Barge, deck.....	215.00	75	0	26	2	7 8	0	1912	do.....
No. 13.....	do.....	215.00	75	0	26	2	7 8	0	1912	do.....

MEMPHIS, TENN. (M. R. C.), FIRST AND SECOND DISTRICTS.

Chisca.....	Stern-wheel towboat....	450.00	185	6	34	11	4	8	1897	Jeffersonville
Graham.....	do.....	138.00	136	1	27	8	4	0	1879	Pittsburg
Itasca.....	do.....	80.00	94	0	15	5	5	0	1882	Carondelet
Minnetonka.....	do.....	490.00	204	2	36	2	5	4	1883	Jeffersonville
Nolly, Augustus J.....	do.....	150.00	136	0	25	1	5	0	1912	Dubuque
Rees, W. M.....	do.....	150.00	136	0	25	1	5	0	1912	do.....

¹ Formerly No. 5 drill boat.² Formerly No. 6 drill boat.³ Formerly No. 7 drill boat.⁴ Formerly No. 3, G. & B. derrick boat.

388.7

LOUISVILLE, KY.—Continued.

MANILA, P. I.

MEMPHIS, TENN. (M. R. C.), FIRST AND SECOND DISTRICTS.

⁹ Hull in poor condition. Machinery in good condition.

TABLE III.—Statement of floating plant owned by the United States Army,
MEMPHIS, TENN. (M. R. C.), FIRST AND SECOND DISTRICTS—Continued.

Name or number.	Type.	Dis- place- ment.	Dimensions.				When.	Where.
			Length.	Beam.	Depth.			
		Long tons.	Ft. in.	Ft. in.	Ft. in.			
Search ¹	Stern-wheel towboat....	200.00	138 10	28 9	4 10	1893		Marietta, O.
Wynoka.....	do.....	560.00	199 4	37 8	5 6	1899		Dubuque, Ia.
Opelika ²	Gasoline launch.....	37.00	60 6	12 6	5 3	1912		Alton, Ill.
No. 3.....	Derrick boat.....	60.00	75 0	30 0	5 0	1905		Memphis, T.
No. 1017.....	do.....	74.00	90 0	32 0	5 0	1911		do.....
No. 1411.....	do.....	84.00	90 0	32 0	5 0	1914		do.....
No. 2.....	Hydraulic grader.....	150.00	110 0	30 0	5 0	1882		New Albany
No. 1022.....	do.....	180.00	110 0	30 0	6 0	1911		Memphis, T.
No. 1205.....	do.....	192.00	120 11	30 2	7 0	1914		do.....
No. 1401 ³	do.....	196.00	120 11	30 2	7 0	1915		do.....
No. 1407 ⁴	Hydraulic sand and gravel digger.....	165.00	120 0	30 0	7 0	1915		do.....
No. 4.....	Pile driver.....	75.00	68 0	20 0	3 14	1894		Cincinnati, O.
No. 1208 ⁷	Concrete mixing plant....	400.00	120 11	45 2	7 0	1915		Memphis, T.
Dry Dock.....	Floating.....	140.00	145 0	36 0	10 0	1889		do.....
No. 2.....	Quarter boat.....	130.00	135 0	30 0	3 11	1893		Cincinnati, O.
No. 3.....	do.....	130.00	135 0	30 0	3 11	1893		do.....
No. 5.....	do.....	130.00	135 0	30 0	3 11	1893		do.....
No. 6.....	do.....	130.00	135 0	30 0	3 11	1893		do.....
No. 8.....	Store boat.....	125.00	135 0	31 0	8 0	1882		Memphis, T.
No. 11.....	Quarter boat.....	125.00	135 0	31 0	8 0	1882		do.....
No. 12.....	Store boat.....	125.00	135 0	31 0	8 0	1882		do.....
No. 25.....	Quarter boat.....	125.00	135 0	31 0	8 0	1882		Ohio River.
No. 26.....	Carpenter shop.....	125.00	135 0	31 0	8 0	1882		do.....
No. 27 ⁸	Quarter boat.....	82.00	100 4	26 54	4 0	1882		do.....
No. 29 (Amelia).....	do.....	43.00	90 6	18 6	4 0	1882		do.....
No. 206.....	do.....	130.00	120 0	30 0	6 0	1894		Memphis, T.
No. 221.....	do.....	130.00	120 0	30 0	6 0	1894		do.....
No. 0601.....	do.....	30.00	30 0	23 6	4 0	1906		do.....
No. 1020.....	do.....	156.00	140 0	30 0	4 0	1911		do.....
No. 1021.....	do.....	156.00	140 0	30 0	4 0	1911		do.....
No. 1301.....	do.....	77.00	100 0	26 0	4 0	1914		do.....
No. 1402.....	do.....	190.00	160 0	36 6	4 0	1914		do.....
No. 1.....	Machine-shop boat.....	165.00	132 0	32 0	8 0	1882		New Albany
No. 0806.....	Boiler-shop boat.....	100.00	120 0	30 0	7 0	1908		Memphis, T.
No. 5.....	Mattress barge.....	195.00	145 0	30 0	6 0	1893		Elizabeth, O.
No. 6.....	do.....	195.00	145 0	30 0	6 0	1893		do.....
No. 9308.....	do.....	190.00	141 2	30 2	4 0	1893		Levonna, O.
No. 9312.....	do.....	190.00	141 2	30 2	4 0	1893		do.....
No. 0701.....	do.....	185.00	140 0	32 0	4 0	1907		Memphis, T.
No. 0703.....	do.....	185.00	140 0	32 0	4 0	1907		do.....
No. 1018.....	do.....	185.00	140 0	30 0	4 0	1910		do.....
No. 1019.....	do.....	185.00	140 0	30 0	4 0	1910		do.....
No. 1501.....	do.....	278.00	126 0	40 0	2 6	1915		do.....
No. 1502.....	do.....	278.00	126 0	40 0	2 6	1915		do.....
No. 1.....	Mooring barge.....	*70.00	120 0	25 0	5 0	1890		do.....
No. 2.....	do.....	70.00	120 0	25 0	5 0	1890		do.....
No. 9318.....	do.....	83.00	120 0	30 0	6 0	1893		Madison, Ind.
No. 9327.....	do.....	83.00	120 0	30 0	6 0	1893		Levonna, O.
No. 1222.....	do.....	80.00	125 0	26 0	5 0	1912		Memphis, T.
No. 1223.....	do.....	80.00	125 0	26 0	5 0	1912		do.....
No. 1224.....	do.....	80.00	125 0	26 0	5 0	1912		do.....
No. 1225.....	do.....	80.00	125 0	26 0	5 0	1912		do.....
No. 9309 ¹⁰	400-ton decked barge.....	83.00	120 0	30 0	6 0	1893		Elizabeth, O.
No. 9315.....	do.....	83.00	120 0	30 0	6 0	1893		Madison, Ind.
No. 9319.....	do.....	83.00	120 0	30 0	6 0	1893		do.....
No. 9325.....	do.....	83.00	120 0	30 0	6 0	1893		do.....
No. 122.....	Model barge.....	425.00	135 0	28 0	5 0	1894		Cincinnati, O.
No. 126.....	do.....	425.00	135 0	28 0	5 0	1894		do.....
No. 128.....	do.....	425.00	135 0	28 0	5 0	1894		Madison, Ind.

¹ Formerly No. 96235, H. D. Munson.² Transferred from St. Louis, Mo. (Mississippi River Commission).³ Formerly Santa Claus.⁴ Crescoted wood.⁵ Formerly decked barge 1211.⁶ Formerly decked barge No. 1407.

FLOATING PLANT.

3889

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

MEMPHIS, TENN. (M. R. C.), FIRST AND SECOND DISTRICTS—Continued.

When.	Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
	Where.							
1886	St. Louis, Mo. ¹	Wood.		\$2,000.00	\$6,869.26	Good.	\$3,812.15	Improving Mississippi River, first and second districts.
	do. ²	Steel.		45,672.00	19,103.93	do.	2,245.78	Do.
1913	St. Louis, Mo.	Wood.		12,500.00	7,612.01	Fair.	821.00	Do.
	do.	do.		2,966.00	5,133.00	Good.	811.87	Do.
	do. ³	do.		5,969.40	4,261.47	do.	10.49	Do.
	do. ⁴	do.		8,481.70	8,135.46	do.	575.46	Do.
	do.	do.		30,282.00	0.00	Worthless.	0.00	Do.
	do. ⁴	do.		15,900.00	12,197.79	Good.	458.16	Do.
	do.	Steel.		31,721.07	28,413.27	do.	1,859.35	Do.
	do.	do.		30,808.43	28,111.25	do.	585.01	Do.
	do.	Wood.		12,445.00	11,646.49	do.	160.66	Do.
	St. Louis, Mo. ¹	do.		4,500.00	1,800.00	do.	0.00	Do.
	do.	Steel.		32,890.00	25,613.07	do.	14,726.00	Do.
	do.	Wood.		9,475.00	1,017.22	Poor.	181.16	Do.
	do. ¹	do.		5,200.00	3,300.00	Good.	0.00	Do.
	do. ¹	do.		5,200.00	3,300.00	do.	0.00	Do.
	do. ¹	do.		5,200.00	3,300.00	do.	0.00	Do.
	do. ¹	do.		5,200.00	3,300.00	do.	0.00	Do.
	do.	do.		3,646.00	2,626.68	do.	140.92	Do.
	do.	do.		3,646.00	1,916.03	Poor.	90.92	Do.
	do.	do.		3,645.00	2,579.93	Good.	103.85	Do.
	do.	do.		3,645.00	919.69	Poor.	25.32	Do.
	do.	do.		3,645.00	1,719.15	Fair.	39.37	Do.
	do. ¹	do.		2,788.00	3,764.47	Good.	2,607.94	Do.
	do.	do.		2,741.00	1,168.01	Fair.	0.00	Do.
	do.	do.		4,900.00	3,742.64	do.	22.64	Do.
	do.	do.		4,900.00	4,195.33	do.	155.72	Do.
	do.	do.		3,059.00	2,032.18	do.	150.96	Do.
	do. ¹	do.		9,889.11	6,183.75	Good.	191.60	Do.
	do. ¹	do.		9,889.11	6,024.21	do.	42.08	Do.
	do. ¹	do.		5,800.00	4,375.19	do.	0.00	Do.
	do. ¹	do.		10,399.94	7,845.43	do.	0.00	Do.
	do.	do.		8,501.00	9,216.85	Fair.	3,032.05	Do.
	do.	do.		3,531.51	860.94	Poor.	13.10	Do.
	do. ¹	do.		4,530.00	2,419.80	Good.	37.61	Do.
	do. ¹	do.		4,530.00	2,373.62	do.	37.61	Do.
	do. ¹	do.		2,800.00	5,171.33	do.	0.00	Do.
	do. ¹	do.		2,800.00	5,286.90	do.	0.00	Do.
	do. ¹	do.		5,120.00	3,371.59	do.	25.00	Do.
	do. ¹	do.		5,120.00	3,537.69	do.	25.00	Do.
	do. ¹	do.		4,642.91	3,412.38	do.	0.00	Do.
	do. ¹	do.		4,642.91	3,391.82	do.	0.00	Do.
	do. ¹	do.		6,992.02	6,908.09	do.	1,001.53	Do.
	do. ¹	do.		6,992.02	7,060.03	do.	1,063.47	Do.
	do.	do.		2,023.00	404.78	Poor.	108.78	Do.
	do.	do.		2,023.00	216.83	do.	0.00	Do.
	do. ¹	do.		3,170.00	1,694.39	Good.	42.65	Do.
	do. ¹	do.		2,466.66	2,164.88	do.	39.05	Do.
	do. ¹	do.		3,560.00	2,523.31	do.	0.00	Do.
	do. ¹	do.		3,780.00	2,662.71	do.	0.00	Do.
	do. ¹	do.		3,560.00	2,550.09	do.	15.84	Do.
	do. ¹	do.		3,780.00	2,689.26	do.	19.48	Do.
	do. ¹	do.		3,170.00	3,278.23	do.	55.47	Do.
	do.	do.		3,170.00		do.		Do.
	do.	do.		3,170.00		less.		Do.
1916	St. Louis, Mo. ¹¹	do.		2,466.66		do.		Do.
1916	do.	do.		3,847.00	1,500.00	Poor.		Do.
1916	do.	do.		2,835.00	1,500.00	do.		Do.
1916	do.	do.		3,590.00	1,500.00	Fair.		Do.

¹ Formerly decked barge No. 1208.

² Hull rebuilt of creosoted wood, 1916.

³ Creosoted.

⁴ Coal-loading outfit on barge.

¹¹ Transferred from St. Louis (Mo.) District, Mississippi River.

TABLE III.—Statement of floating plant owned by the United States and
MEMPHIS, TENN. (M. R. C.), FIRST AND SECOND DISTRICTS—Continued.

Name or number.	Type.	Dis- place- ment.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		Where.
		Long tons.	Ft. in.	Ft. in.	Ft. in.		
No. 131.....	Model barge.....	425.00	135 0	28 0	5 0	1894	Madison, Ind.....
No. 133.....	do.....	425.00	135 0	28 0	5 0	1894	Jeffersonville, Ind.....
No. 134.....	do.....	425.00	135 0	28 0	5 0	1894	do.....
No. 135.....	do.....	425.00	135 0	28 0	5 0	1894	do.....
No. 137.....	do.....	425.00	135 0	28 0	5 0	1894	do.....
No. 212.....	do.....	425.00	135 0	28 0	5 0	1894	Madison, Ind.....
No. 214 ¹	do.....	425.00	135 0	28 0	5 0	1894	Cincinnati, Ohio.....
No. 216.....	do.....	425.00	135 0	28 0	5 0	1894	do.....
No. 217.....	do.....	425.00	135 0	28 0	5 0	1894	do.....
No. 0801.....	500-ton decked barge.....	100.00	120 0	30 0	7 0	1908	Gulfport, Miss.....
No. 0802.....	do.....	100.00	120 0	30 0	7 0	1908	do.....
No. 0803.....	do.....	100.00	120 0	30 0	7 0	1908	do.....
No. 0804.....	do.....	100.00	120 0	30 0	7 0	1908	do.....
No. 0805.....	do.....	100.00	120 0	30 0	7 0	1908	Memphis, Tenn.....
No. 0807.....	do.....	100.00	120 0	30 0	7 0	1908	do.....
No. 0808.....	do.....	100.00	120 0	30 0	7 0	1908	do.....
No. 0809.....	do.....	100.00	120 0	30 0	7 0	1908	do.....
No. 0811.....	do.....	100.00	120 0	30 0	7 0	1908	Gulfport, Miss.....
No. 0801.....	do.....	100.00	120 0	30 0	7 0	1909	do.....
No. 0803.....	do.....	100.00	120 0	30 0	7 0	1909	do.....
No. 1001.....	do.....	100.00	120 0	30 0	7 0	1910	Memphis, Tenn.....
No. 1002.....	do.....	100.00	120 0	30 0	7 0	1910	do.....
No. 1003.....	do.....	100.00	120 0	30 0	7 0	1910	do.....
No. 1004.....	do.....	100.00	120 0	30 0	7 0	1910	do.....
No. 1005.....	do.....	100.00	120 0	30 0	7 0	1910	do.....
No. 1006.....	do.....	100.00	124 0	30 0	7 0	1911	do.....
No. 1007.....	do.....	100.00	124 0	30 0	7 0	1910	New Orleans, La.....
No. 1008.....	do.....	100.00	124 0	30 0	7 0	1910	do.....
No. 1009.....	do.....	100.00	124 0	30 0	7 0	1910	do.....
No. 1010.....	do.....	100.00	124 0	30 0	7 0	1910	do.....
No. 1011.....	do.....	100.00	124 0	30 0	7 0	1910	do.....
No. 1012.....	do.....	100.00	124 0	30 0	7 0	1910	do.....
No. 1101.....	do.....	100.00	120 0	30 0	7 0	1911	Memphis, Tenn.....
No. 1201 ¹	do.....	120.00	120 11	30 2	7 0	1912	Ambridge, Pa.....
No. 1202.....	do.....	120.00	120 11	30 2	7 0	1912	do.....
No. 1203.....	do.....	120.00	120 11	30 2	7 0	1912	do.....
No. 1204.....	do.....	120.00	120 11	30 2	7 0	1912	do.....
No. 1206.....	do.....	120.00	120 11	30 2	7 0	1912	do.....
No. 1207.....	do.....	120.00	120 11	30 2	7 0	1912	do.....
No. 1209.....	do.....	120.00	120 11	30 2	7 0	1912	do.....
No. 1210.....	do.....	120.00	120 11	30 2	7 0	1912	do.....
No. 1212.....	do.....	120.00	120 11	30 2	7 0	1912	do.....
No. 1213.....	do.....	120.00	120 11	30 2	7 0	1912	do.....
No. 1214.....	do.....	120.00	120 11	30 2	7 0	1912	do.....
No. 1215.....	do.....	100.00	120 0	30 0	7 0	1912	Memphis, Tenn.....
No. 1216.....	do.....	100.00	120 0	30 0	7 0	1912	do.....
No. 1217.....	do.....	100.00	120 0	30 0	7 0	1912	do.....
No. 1218.....	do.....	100.00	120 0	30 0	7 0	1912	do.....
No. 1219.....	do.....	100.00	120 0	30 0	7 0	1912	do.....
No. 1220.....	do.....	100.00	120 0	30 0	7 0	1912	do.....
No. 1221.....	do.....	100.00	120 0	30 0	7 0	1912	do.....
No. 1302.....	do.....	100.00	120 0	30 0	7 0	1913	do.....
No. 1303.....	do.....	100.00	120 0	30 0	7 0	1913	do.....
No. 1304.....	do.....	100.00	120 0	30 0	7 0	1913	do.....
No. 1305.....	do.....	100.00	120 0	30 0	7 0	1913	do.....
No. 1306.....	do.....	100.00	120 0	30 0	7 0	1913	do.....
No. 1307.....	do.....	120.00	121 4	30 2	7 0	1913	Ambridge, Pa.....
No. 1308.....	do.....	120.00	121 4	30 2	7 0	1913	do.....
No. 1309.....	do.....	120.00	121 4	30 2	7 0	1913	do.....
No. 1310.....	do.....	120.00	121 4	30 2	7 0	1913	do.....
No. 1314.....	do.....	120.00	121 4	30 2	7 0	1913	do.....
No. 1315.....	do.....	120.00	121 4	30 2	7 0	1913	do.....
No. 1316.....	do.....	120.00	121 4	30 2	7 0	1913	do.....
No. 1317.....	do.....	120.00	121 4	30 2	7 0	1913	do.....
No. 1318.....	do.....	120.00	121 4	30 2	7 0	1913	do.....
No. 1403.....	do.....	100.00	120 0	30 0	7 0	1914	Memphis, Tenn.....

¹ Sunk.² Creosoted.³ Cement carrier.

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

MEMPHIS, TENN. (M. R. C.), FIRST AND SECOND DISTRICTS—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
1916	St. Louis, Mo...	Wood.	\$3,890.00	\$1,500.00	Fair..		Improving Mississippi River, first and second districts.
1916	do.	do.	\$3,650.00	\$1,800.00	do.		Do.
1916	do.	do.	3,650.00	1,500.00	do.		Do.
1916	do.	do.	3,650.00	1,500.00	do.		Do.
1916	do.	do.	3,650.00	1,500.00	do.		Do.
1916	do.	do.	3,900.00	1,500.00	do.		Do.
1916	do.	do.	3,597.00	1,500.00	Worthless.		Do.
1916	do.	do.	3,597.00	1,500.00	Fair..		Do.
1916	do.	do.	3,597.00	1,500.00	do.		Do.
		do.	5,727.53	3,041.06	Good.		Do.
		do.	5,727.53	2,949.96	do.		Do.
		do.	5,727.53	3,132.66	do.	\$8.50	Do.
		do.	5,727.53	2,980.46	do.		Do.
		do.	3,531.50	756.62	Fair..	221.00	Do.
		do.	5,624.70	1,819.92	Good.	82.40	Do.
		do.	5,624.70	1,757.70	do.	41.50	Do.
		do.	5,624.70	1,756.34	do.	170.95	Do.
		do.	5,727.53	2,949.68	do.		Do.
		do.	5,599.58	3,010.01	do.		Do.
		do.	5,599.58	3,036.87	do.		Do.
		do.	4,942.00	2,977.91	do.		Do.
		do.	4,942.00	2,865.56	do.		Do.
		do.	4,942.00	2,873.95	do.		Do.
		do.	4,942.00	2,890.75	do.		Do.
		do.	4,050.00	2,871.39	do.		Do.
		do.	4,050.00	2,796.97	do.		Do.
		do.	4,946.58	3,099.89	do.		Do.
		do.	4,946.58	3,018.79	do.	15.40	Do.
		do.	4,946.58	3,133.43	do.	51.43	Do.
		do.	4,946.58	3,006.55	do.		Do.
		do.	4,946.58	3,064.44	do.		Do.
		do.	4,946.58	3,000.35	do.		Do.
		do.	4,300.00	3,253.95	do.	150.70	Do.
		Steel.	8,500.00	7,201.97	do.		Do.
		do.	8,500.00	7,056.88	do.		Do.
		do.	8,500.00	7,149.84	do.		Do.
		do.	8,500.00	7,108.49	do.		Do.
		do.	8,500.00	7,140.13	do.		Do.
		do.	8,500.00	7,112.23	do.		Do.
		do.	8,500.00	7,067.24	do.		Do.
		do.	8,500.00	7,209.62	do.		Do.
		do.	8,500.00	6,899.12	do.		Do.
		do.	8,500.00	6,899.12	do.		Do.
		do.	8,500.00	7,179.12	do.		Do.
		Wood.	4,194.00	3,251.57	do.		Do.
		do.	4,194.00	3,475.58	do.	227.39	Do.
		do.	4,194.00	3,144.47	do.		Do.
		do.	4,194.00	3,218.60	do.		Do.
		do.	4,194.00	3,067.05	do.		Do.
		do.	4,194.00	3,163.35	do.		Do.
		do.	4,194.00	3,209.93	do.	36.00	Do.
		do.	4,773.15	3,785.79	do.		Do.
		do.	4,773.15	3,659.43	do.		Do.
		do.	4,773.15	3,741.34	do.		Do.
		do.	4,773.15	3,997.27	do.	289.63	Do.
		do.	4,773.15	3,700.64	do.		Do.
		Steel.	8,500.00	7,036.50	do.		Do.
		do.	8,500.00	7,045.86	do.		Do.
		do.	8,500.00	7,036.50	do.		Do.
		do.	8,500.00	7,036.50	do.		Do.
		do.	8,500.00	7,036.50	do.		Do.
		do.	8,500.00	7,036.50	do.		Do.
		do.	8,500.00	7,036.50	do.		Do.
		do.	8,500.00	7,036.50	do.		Do.
		do.	8,500.00	7,036.50	do.		Do.
		do.	8,500.00	7,036.50	do.		Do.
		Wood.	4,500.00	3,852.58	do.	36.75	Do.

TABLE III.—Statement of floating plant owned by the United States Army, MEMPHIS, TENN. (M. R. C.), FIRST AND SECOND DISTRICTS—Continued

Name or number.	Type.	Displacement.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
		Long tons.	Ft. in.	Ft. in.	Ft. in.		
No. 1404.....	500-ton decked barge....	109.00	120 0	30 0	7 0	1914	Memphis,
No. 1405.....	do.....	109.00	120 0	30 0	7 0	1914	do.....
No. 1406.....	do.....	109.00	120 0	30 0	7 0	1914	do.....
No. 1408.....	do.....	109.00	120 0	30 0	7 0	1914	do.....
No. 1409.....	do.....	109.00	120 0	30 0	7 0	1914	do.....
No. 1410.....	do.....	109.00	120 0	30 0	7 0	1914	do.....
No. 4.....	Flat boat.....	10.00	50 0	15 0	3 0	1906	do.....
No. 5.....	do.....	10.00	50 0	15 0	3 0	1911	do.....
No. 1311.....	do.....	10.00	50 0	15 0	3 0	1913	do.....
No. 1312.....	do.....	10.00	50 0	15 0	3 0	1913	do.....
No. 1313.....	do.....	10.00	50 0	15 0	3 0	1913	do.....
No. 1.....	Calking flat.....	5.00	32 0	5 0	1 0	1906	do.....
No. 1.....	Skiff.....		10 0	3 6	1 6	1915	Grafton, Ill.
No. 2.....	do.....		22 0	5 0	1 8	1915	Memphis,
No. 3.....	do.....		21 0	4 9	1 5	1916	do.....
No. 4.....	do.....		20 0	4 9	1 6	1916	do.....
No. 5.....	do.....		20 0	4 9	1 6	1916	do.....
No. 13.....	do.....		18 0	4 6	1 6	1910	Leavenworth,
No. 14.....	do.....		18 0	4 6	1 6	1910	do.....
No. 15.....	do.....		18 0	4 6	1 6	1910	Leavenworth,
No. 16.....	do.....		16 0	3 0	1 6	1912	Memphis,
No. 17.....	do.....		20 0	5 0	2 0	1909	do.....
No. 18.....	do.....		20 0	5 0	2 0	1909	do.....
No. 19.....	do.....		20 0	5 0	2 0	1909	do.....
No. 20.....	do.....		20 0	5 0	2 0	1909	do.....
No. 21.....	do.....		20 0	5 0	2 0	1909	do.....
No. 22.....	do.....		20 0	5 0	1 6	1913	do.....
No. 23.....	do.....		20 0	5 0	1 6	1913	do.....
No. 24.....	do.....		20 0	5 0	1 6	1913	do.....
No. 25.....	do.....		20 0	5 0	1 6	1913	do.....
No. 26.....	do.....		18 0	4 6	1 5	1914	do.....
No. 27.....	do.....		20 0	5 2	1 6	1914	do.....
No. 28.....	do.....		24 0	5 5	1 6	1914	do.....
No. 29.....	do.....		21 10	4 9	1 4	1914	do.....
No. 30.....	do.....		21 10	4 9	1 4	1914	do.....
No. 31.....	do.....		21 10	4 9	1 4	1914	do.....
No. 32.....	do.....		14 0	4 6	2 0		
No. 33.....	Metallic yawl.....		24 0	5 5	1 6		
No. 34.....	do.....		25 0	5 5	1 6		
No. 35.....	do.....		25 0	5 5	1 6		
Search No. 1.....	Lifeboat.....		16 0	4 6	1 6	1895	St. Louis,
Search No. 2.....	do.....		16 0	4 6	1 6	1895	do.....

MILWAUKEE, WIS.

Appleton ¹	Steam dipper dredge....	214.00	90 0	32 0	7 0	1872	Dubuque,
Kewaunee ²	do.....	442.50	100 0	34 0	9 0	1913	Milwaukee
Omro.....	Steam grapple dredge....	150.00	100 0	30 0	6 0	1878	Portage, W.
Oshkosh ³	Steam elevator dredge....	234.00	75 0	31 0	6 0	1905	Green Bay
Ariadne ⁴	Steam launch (screw)....	8.00	45 6	9 0	4 0	1899	Manitowoc
Industry.....	Steam tug (screw).....	110.00	71 8	16 0	7 10	1900	do.....
Manitowoc ⁵	Tow and survey steamer (screw).....	200.00	100 0	21 6	10 7	1909	do.....
Fox ¹	Steam tug (side wheel)...	128.00	107 9	20 0	5 0	1900	Oshkosh, W.
Wolf.....	do.....	114.00	89 0	20 0	4 6	1900	do.....
Heron ⁴	Gasoline launch (16 horse-power).....	11.00	36 0	9 6	4 5	1908	Manitowoc
Kingfisher ⁵	Gasoline launch (45 horse-power).....	19.00	41 1	11 0	4 0	1908	do.....

¹ Repaired by United States in 1916 and new boiler installed in 1915.² Repaired by United States in 1916.³ Repaired and lengthened in 1911.

in the Engineer Department at large on Dec. 31, 1916—Continued.

MEMPHIS, TENN. (M. R. C.), FIRST AND SECOND DISTRICTS—Continued.

Purchased.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Where.						
	Wood.	\$4,500.00	\$3,913.88	Good.		Improving Mississippi River, first and second districts.
do.	do.	4,500.00	4,123.24	do.		Do.
do.	do.	4,500.00	3,783.57	do.		Do.
do.	do.	4,500.00	3,824.51	do.		Do.
do.	do.	4,500.00	3,774.87	do.		Do.
do.	do.	4,500.00	3,913.35	do.		Do.
do.	do.	460.50	100.00	Poor.	\$40.75	Do.
do.	do.	499.80	385.35	Fair.		Do.
do.	do.	743.04	582.04	Good.		Do.
do.	do.	743.04	587.85	do.		Do.
do.	do.	743.04	593.28	do.		Do.
do.	do.	20.00	20.00	Fair.		Do.
rafton, Ill.	Steel.	47.23	42.51	Good.		Do.
Memphis, Tenn.	Wood.	40.00	32.00	do.		Do.
do.	do.	40.00	37.00	do.		Do.
do.	do.	40.00	37.00	do.		Do.
do.	do.	40.00	37.00	do.		Do.
do.	do.	40.00	37.00	do.		Do.
do.	do.	35.00	10.00	Fair.	1.50	Do.
do.	do.	35.00	10.00	do.	1.50	Do.
do.	do.	35.00	10.00	do.	1.50	Do.
Memphis, Tenn.	do.	39.00	25.00	do.	1.50	Do.
do.	do.	40.00	10.00	do.	1.50	Do.
do.	do.	40.00	10.00	do.	1.50	Do.
do.	do.	40.00	10.00	do.	1.50	Do.
do.	do.	40.00	10.00	do.	1.50	Do.
do.	do.	40.00	10.00	do.	1.50	Do.
do.	do.	40.00	10.00	do.	1.50	Do.
do.	do.	40.00	10.00	do.	1.50	Do.
do.	do.	39.00	17.00	do.	1.50	Do.
do.	do.	39.00	17.00	do.	1.50	Do.
do.	do.	39.00	17.00	do.	1.50	Do.
do.	do.	39.00	17.00	do.	1.50	Do.
Memphis, Tenn.	do.	36.00	20.00	Good.	1.50	Do.
do.	do.	40.00	20.00	do.	1.50	Do.
do.	do.	48.00	32.00	do.	1.50	Do.
do.	do.	42.00	36.00	do.	1.50	Do.
do.	do.	42.00	36.00	do.	1.50	Do.
do.	do.	42.00	36.00	do.	1.50	Do.
do.	do.	50.00	10.00	Poor.		Do.
do.	do.	50.00	15.00	Fair.		Do.
do.	do.	50.00	15.00	do.		Do.
do.	do.	50.00	15.00	do.		Do.
do.	do.	50.00	15.00	do.		Do.
St. Louis, Mo.	do.	85.00	15.00	do.		Do.
do.	do.	85.00	15.00	do.		Do.

MILWAUKEE, WIS.

Merlin, Wis.	Wood.	\$13,000.00	\$10,178.53	Fair.	\$1,754.00	Fox River improvement.
do.	Composite.	47,750.00	44,000.00	Good.	3,432.61	Harbors, west shore of Lake Michigan.
do.	Wood.	5,500.00	3,318.04	Fair.	400.88	Fox River improvement.
do.	do.	27,500.00	18,526.39	Good.	2,115.55	Do.
do.	do.	2,400.00	900.00	Poor.	70.16	Harbors, west shore of Lake Michigan.
enominee, Mich.	do.	5,000.00	4,000.00	Fair.	755.74	Do.
do.	Steel.	39,000.00	30,000.00	Good.	1,410.29	Do.
do.	Wood.	7,135.00	3,259.07	do.	826.50	Fox River improvement.
do.	do.	7,675.00	3,526.88	do.	354.69	Do.
do.	do.	1,540.00	850.00	do.	42.07	Harbors, west shore of Lake Michigan.
do.	do.	1,960.00	1,600.00	do.	177.85	Do.

changed from Gasoline Launch No. 3 in 1911.

changed from Gasoline Launch No. 2 in 1911, and in 1910 engine changed to 45 horsepower.

TABLE III.—Statement of floating plant owned by the United States Army.

MILWAUKEE, WIS.—Continued.

Name or number.	Type.	Displacement.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
		<i>Long tons.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>		<i>Where.</i>
Mallard ¹	Gasoline launch (16 horse-power).	8.00	35 0	9 0	4 2	1907	Two Rivers, W.
Derrick scow No. 1.....	Derrick (floating).....	81.50	66 6	29 6	5 10	1903	Milwaukee, W.
Derrick scow No. 2.....	do.....	131.00	84 2	27 4	6 8	1908	Sturgeon Bay, W.
Derrick scow No. 3 ²	Derrick (floating) (with portable hand derrick).	44.00	80 0	20 0	4 9	1901	Oshkosh, Wis.
Derrick scow No. 4 ³	do.....	44.00	80 0	20 0	4 9	1901	do.....
Pile driver scow No. 1.....	Pile driver (floating).....	111.00	66 4	21 4	6 6	1894	Sheboygan, W.
Pile driver scow No. 2.....	do.....	118.00	80 0	25 4	6 6	1906	Sturgeon Bay, W.
No. 2.....	Quarterboat (accommodations for 18 persons).	26.00	70 0	18 3	3 6	1911	Kaukauna, W.
Delivery scow ⁴	Steel superstructure, flat scow, with conveyor, for dredge Oshkosh.	42.00	31 4	(⁵)	(⁷)	1905	Green Bay, W.
Intermediate scow No. 2.....	Wood superstructure, flat scow, with conveyor, for dredge Oshkosh.	42.00	40 0	16 0	3 0	1905	do.....
No. 4.....	150-ton flat scow.....	78.00	78 0	22 0	8 0	1898	Kewaunee, W.
No. 7.....	280-ton flat scow.....	67.00	84 2	27 4	6 8	1911	do.....
No. 8.....	100-ton flat scow.....	30.75	60 0	21 0	5 0	1913	do.....
Eureka No. 2.....	65-ton flat scow (with pile driver).	27.00	70 0	18 0	4 0	1910	Kaukauna, W.
No. 5.....	25-ton flat scow.....	12.00	50 0	16 0	3 0	1904	Oshkosh, Wis.
No. 6.....	do.....	14.00	50 0	16 0	3 0	1903	do.....
No. 1.....	3-ton flat work scow.....	2.60	30 0	10 0	2 8	1909	Kaukauna, W.
No. 2.....	do.....	2.60	30 0	10 0	2 8	1910	do.....
No. 7 ⁶	280-cubic yard, center dump scow.	230.00	117 4	26 0	9 0	1914	Kewaunee, W.
No. 8 ⁴	do.....	230.00	117 4	26 0	9 0	1914	do.....
No. 5.....	1-ton open scow.....	0.28	14 0	4 0	1 8	1906	Kaukauna, W.
No. 6.....	do.....	.23	14 0	4 0	1 8	1910	do.....
No. 7.....	do.....	.23	14 0	4 0	1 8	1911	do.....
No. 8.....	do.....	.54	18 0	5 6	1 8	1912	do.....
No. 9.....	do.....	.54	18 0	5 6	1 8	1912	do.....
No. 2 ²	20-ton pontoon scow.....	14.00	40 0	14 5	3 2	1908	do.....
No. 3 ²	do.....	14.00	40 0	14 5	3 2	1908	do.....
No. 4 ²	do.....	14.00	40 0	14 5	3 2	1910	do.....
Berlin.....	80-ton barge.....	26.00	81 2	18 6	4 2	1906	Oshkosh, Wis.
Kaukauna.....	200-ton barge.....	78.00	132 0	26 6	5 7	1912	Kaukauna, W.
Montello.....	80-ton barge.....	24.00	80 0	18 0	4 0	1908	Green Bay, W.
Riprap ⁵	850-ton barge.....	220.00	140 0	34 0	10 9	1911	Sturgeon Bay, W.

MOBILE, ALA.

Charleston.....	Seagoing hopper dredge.	800.00	122 6	30 0	12 0	1891	Brooklyn, N. Y.
Gulfport.....	Hydraulic pipe-line dredge.	886.00	150 0	40 0	11 6	1913	Baltimore, Md.
Pascagoula.....	do.....	771.00	150 0	40 0	10 6	1909	do.....
Wahalak.....	do.....	886.00	150 0	40 0	11 9	1910	do.....
Chas. Humphreys.....	do.....	234.00	129 9	32 0	8 9	1908	Mobile, Ala.
No. 6 ⁶	do.....	91.00	122 7	24 0	5 0	1903	Tuscaloosa, Ala.
R. C. McCalla.....	Stern-wheel snag boat ..	133.00	119 6	28 3	5 0	1909	Jeffersonville, Ind.
Pearl.....	do.....	128.00	96 6	26 0	5 0	1903	Mobile, Ala.

¹ Name changed from Gasoline Launch No. 1 in 1911.² Concrete mixer on scow.³ Rebuilt in 1910-11.⁴ With pile driver.⁵ Repaired by United States in 1916.

and in the Engineer Department at large on Dec. 31, 1916—Continued.

MILWAUKEE, WIS.—Continued.

Purchased:						
Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Two Rivers, Wis	Wood.	\$1,080.00	\$400.00	Fair...	\$80.00	Harbor, west shore of Lake Michigan.
Milwaukee, Wis.	do.	2,000.00	1,100.00	Good.	57.19	Do.
Waukegan Bay, Wis.	do.	5,625.00	3,400.00	Fair...	210.03	Do.
do.	do.	2,000.00	1,028.85	Poor..	95.60	Fox River improvement.
do.	do.	2,000.00	1,829.64	Good.	6.75	Do.
Waukegan, Wis.	do.	3,450.00	1,600.00	Fair...		Harbors, west shore of Lake Michigan.
Waukegan, Ill.	do.	4,840.00	2,700.00	Good.		Do.
do.	do.	1,675.00	1,435.88	do.		Fox River improvement.
do.	do.	5,000.00	1,813.35	do.	96.39	Do.
do.	do.	3,250.00	1,929.09	Fair...	63.74	Do.
do.	do.	3,943.00	1,200.00	Poor..		Harbors, west shore of Lake Michigan.
do.	do.	2,800.00	1,750.00	Good.		Do.
do.	do.	1,929.36	1,400.00	do.		Do.
do.	do.	1,555.00	975.67	Fair...	47.50	Fox River improvement.
do.	do.	890.00	614.47	do.	8.00	Do.
do.	do.	890.00	552.33	do.	8.83	Do.
do.	do.	86.71	67.50	do.	10.00	Do.
do.	do.	153.98	62.70	do.		Do.
do.	do.	7,780.43	5,000.00	Good.	464.03	Harbors, west shore of Lake Michigan.
do.	do.	7,780.43	5,000.00	do.	464.03	Do.
do.	do.	27.42	10.37	Poor..		Fox River improvement.
do.	do.	19.50	13.08	Fair...		Do.
do.	do.	14.04		Unserviceable.		Do.
do.	do.	46.07	33.18	Fair...		Do.
do.	do.	46.08	33.86	Good.		Do.
do.	do.	876.71	1,017.00	do.	869.93	Do.
do.	do.	876.71	1,017.00	do.	853.14	Do.
do.	do.	720.70	527.88	do.	25.53	Do.
do.	do.	2,075.00	1,107.89	do.	13.34	Do.
do.	do.	5,000.00	3,781.03	do.	29.75	Do.
do.	do.	2,014.00	1,126.35	do.	2.50	Do.
do.	do.	10,950.00	7,000.00	do.	400.08	Harbors, west shore of Lake Michigan.

MOBILE, ALA.

do.	Wood.	\$65,000.00	\$50,000.00	Good..	\$1,360.30	Mobile Bar, Horn Island Pass and Ship Island Pass.
Baltimore, Md..	Steel..	168,446.00	145,000.00	do.	7,901.11	Gulfport Harbor, Miss.
do.	do.	143,500.00	121,000.00	do.	13,463.08	Harbors on coast of Mississippi.
Baltimore, Md..	do.	159,000.00	130,000.00	do.	8,427.54	Mobile Harbor, Ala.
do.	Wood.	46,600.00	25,000.00	do.	4,363.18	Black Warrior and Tombigbee Rivers, Ala.
do.	Composite.	3,600.00	3,000.00	do.	327.85	Do.
Personville, Ind	Wood.	19,000.00	10,000.00	do.	2,070.81	Do.
do.	do.	3,250.00	2,500.00	Bad...	503.16	Pearl River, Miss.

* Width: Forward, 16 feet 4 inches; aft, 33 feet.

† Depth: Forward, 2 feet; aft, 4 feet.

* With dredge Oshkosh.

* Steel barge No. 6 converted into 8-inch dredge.

TABLE III.—Statement of floating plant owned by the United States Army.

MOBILE, ALA.—Continued.

Name or number.	Type.	Displacement.	Dimensions.				Built.	
			Length.	Beam.	Depth.		When.	Where.
		<i>Long tons.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>			
Tombigbee.....	Stern-wheel snag boat..	151.00	119 0	26 0	5 4		1909	Jeffersonville
Vienna.....	do.....	152.00	117 6	26 0	4 6		1911	Pascagoula
Demopolis.....	Nonpropelling steam capstan snag boat.	95.00	82 2	25 7	4 0		1891	Mobile, Ala.
Escatawpa.....	Capestan snag boat.....	63.00	60 0	30 0	4 0		1910	Hattiesburg
Derrick boat "C".....	Derrick boat.....	29.00	46 0	32 0	3 6		1900	Tuscaloosa
Tallahatta.....	do.....	81.25	50 0	40 0	5 0		1912	do.....
Chickasaw.....	Steam dispatch boat.....	155.00	109 0	18 8	9 9		1908	Pensacola
Horace Harding.....	Steam tugboat.....	215.00	90 6	23 1	10 6		1909	Pascagoula
Tuscaloosa.....	do.....	212.00	92 0	23 0	8 0		1908	do.....
Nugent.....	Stern-wheel towboat.....	191.00	141 3	24 6	4 3		1904	Jeffersonville
Biloxi.....	Gasoline launch.....	25.00	40 0	13 0	4 7		1909	Gulfport, Miss.
Dauphin.....	do.....	58.7	80 4	17 1	4 6		1913	do.....
Jordan.....	do.....	8.5	32 4	9 8	3 2		1905	Pascagoula
Leaf.....	do.....	4.5	32 0	7 6	4 0		1907	Morris Hill
Mamie K.....	do.....	2.0	25 0	6 0	2 7		1892	do.....
Mulberry.....	do.....	2.62	35 0	6 10	3 10		1911	do.....
Rettig.....	do.....	.25	40 9	12 3	5 0		1914	Pascagoula
Wolf.....	do.....	18.00	36 8	10 0	3 6		1907	Mobile, Ala.
No. 1.....	do.....	2.00	17 0	5 5	2 4		.....	.....
Sylph.....	Gasoline towboat.....	38.00	84 6	16 5	2 9		1900	Demopolis
Ulkunush.....	Stern-wheel towboat.....	40.00	78 6	16 6	3 6		1916	Pascagoula
Quarter boat A ¹	Quarter boat.....	34.00	45 0	24 0	5 0		1904	Tuscaloosa
Quarter boat B.....	do.....	33.00	60 0	24 0	3 4		1904	do.....
Quarter boat D ²	do.....	83.00	70 0	25 0	5 9		1904	Mobile, Ala.
Quarter boat N.....	do.....	66.00	75 6	22 6	5 2		1914	Pascagoula
Quarter boat O.....	do.....	65.00	75 6	22 6	5 2		1914	do.....
Quarter boat Q ³	do.....	89.00	70 0	25 0	5 9		1904	Mobile, Ala.
Barge No. 1.....	200-ton barge.....	51.00	90 5	24 0	5 5		1902	Tuscaloosa
Barge No. 3.....	do.....	51.00	90 5	24 0	5 11		1902	do.....
Barge No. 4.....	do.....	51.00	90 5	24 0	5 11		1902	do.....
Barge No. 5.....	do.....	51.00	90 5	24 0	5 11		1903	do.....
Barge No. 11.....	115-ton barge.....	22.00	60 5	22 0	5 3		1901	Pascagoula
Barge No. 12.....	200-ton barge.....	51.00	90 5	24 0	5 11		1905	Tuscaloosa
Barge No. 13.....	do.....	51.00	90 5	24 0	5 11		1905	do.....
Barge No. 14.....	do.....	51.00	90 5	24 0	5 5		1906	do.....
Barge No. 17.....	150-ton barge.....	44.00	70 6	24 0	6 3		1905	Pascagoula
Barge No. 18.....	do.....	45.00	70 8	24 1	6 3		1906	do.....
Barge No. 19.....	170-ton barge.....	56.00	75 9	25 1	6 8		1906	do.....
Barge No. 20.....	200-ton barge.....	51.00	90 5	24 0	5 11		1907	Tuscaloosa
Barge No. 21.....	do.....	51.00	90 5	24 0	5 11		1907	do.....
Barge No. 22.....	do.....	51.00	90 0	24 0	5 0		1907	do.....
Barge No. 23.....	do.....	51.00	90 5	24 0	5 11		1908	do.....
Barge No. 24.....	177-ton barge.....	58.00	75 0	25 0	6 0		.....	.....
Barge No. 27.....	180-ton barge.....	60.00	75 0	25 0	6 0		.....	.....

¹ Engine and outfit transferred to launch Jordan.² Hull of old 9-inch dredge converted into quarter boat.³ Barge No. 10 converted into quarter boat.

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

MOBILE, ALA.—Continued.

When.	Purchased.		First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
	Where.	Material.					
		Wood.	\$19,080.00	\$10,000.00	Good.	\$1,987.36	Tombigbee River, Ala.
		do.	11,342.00	6,500.00	do.	3,137.96	Tombigbee River, Ala. and Miss.
		do.	4,087.00	1,800.00	do.	872.67	Do.
		do.	3,248.00	1,250.00	Fair.	26.38	Leaf River, Miss.
		do.	1,700.00	100.00	Bad.		Black Warrior and Tombigbee Rivers, Ala.
		do.	6,322.00	3,000.00	Fair.	687.90	Do.
		Steel.	27,500.00	18,000.00	Good.	5,766.91	Mobile Harbor, Ala.
1910	Mobile, Ala.	Wood.	22,500.00	13,000.00	Fair.	429.23	Do.
1906	do.	do.	21,500.00	16,000.00	Good.	947.96	Harbors on coast of Mississippi.
1905	Louisville, Ky.	do.	19,000.00	10,000.00	do.	2,379.56	Black Warrior and Tombigbee Rivers, Ala.
		do.	3,215.00	1,800.00	Fair.	603.66	Harbors on coast of Mississippi.
		do.	17,900.00	14,800.00	Good.	1,000.16	Mobile Harbor, Ala.
1909	Pascagoula, Miss.	do.	800.00	250.00	Fair.	29.58	Pascagoula River, Miss.
1907	Morris Heights, N. Y.	do.	2,350.00	900.00	do.	253.04	Mobile Harbor, Pascagoula River, Horn Island Pass.
1882	Mobile, Ala.	do.	1,000.00	200.00	Bad.	61.00	Black Warrior and Tombigbee Rivers, Ala.
1912	Morris Heights, N. Y.	do.	3,000.00	1,700.00	Fair.	193.18	Do.
		do.	4,685.33	4,000.00	Good.	57.34	Gulfport Harbor, Ship Island Pass, Pascagoula Harbor.
1907	Mobile, Ala.	do.	900.00	15.00	Worn-out.		Defenses of Mobile.
		do.	250.00	225.00	Good.	8.50	Mobile Harbor, Ship Island Pass, Pascagoula Harbor.
1906	Demopolis, Ala.	do.	2,500.00	1,800.00	Fair.	544.47	Black Warrior and Tombigbee Rivers, Ala.
		do.	7,353.81	7,300.00	Good.	11.17	Black Warrior, Warrior, and Tombigbee Rivers, Ala., etc.
		do.	2,000.00	500.00	Fair.	46.13	Black Warrior and Tombigbee Rivers, Ala.
		do.	2,200.00	700.00	do.	49.59	Do.
1905	Mobile, Ala.	do.	1,500.00	2,200.00	Good.	469.86	Do.
		do.	2,110.13	1,100.00	do.	30.13	Tombigbee River, Ala. and Miss.
		do.	2,117.41	1,100.00	do.	27.38	Leaf River, Miss.
1905	Mobile, Ala.	do.	1,500.00	2,300.00	do.	681.78	Black Warrior and Tombigbee Rivers, Ala.
		do.	1,900.00	450.00	Bad.	70.78	Do.
		do.	1,900.00	1,000.00	Fair.		Do.
		do.	1,900.00	1,400.00	Good.	5.26	Do.
		do.	1,900.00	1,500.00	do.	32.25	Do.
1905	Mobile, Ala.	do.	1,495.00	500.00	Fair.		Do.
		do.	2,500.00	1,700.00	Good.	7.97	Do.
		do.	2,300.00	1,700.00	do.	3.21	Do.
		do.	2,300.00	1,800.00	do.	1.50	Do.
1905	Moss Point, Miss.	do.	1,630.00	600.00	Bad.	34.75	Black Warrior, Warrior, and Tombigbee Rivers, Ala.
1906	do.	do.	2,000.00	300.00	do.	60.25	Do.
1907	Mobile, Ala.	do.	2,050.00	750.00	Fair.	6.25	Do.
		do.	2,200.00	1,700.00	Good.	5.43	Do.
		do.	2,090.00	1,700.00	do.		Do.
		do.	2,200.00	600.00	Bad.	31.60	Do.
		do.	2,000.00	1,700.00	Good.		Do.
1913	Oakhia, Ala.	do.	1,200.00		Worthless.		Do.
1913	do.	do.	1,500.00	900.00	Fair.		Do.

¹ Barge No. 8, which was formerly barge No. 9, converted into quarter boat. Total cost of this conversion, \$1,910.10, \$1,242.02 of this amount reported in six-month report, ending Dec. 31, 1915. Barge pulled out Dec. 20, 1915; launched, Feb. 9, 1916.

² Barge No. 27 rebuilt in 1914 at a cost of \$1,366.87.

TABLE III.—Statement of floating plant owned by the United States Army.

MOBILE, ALA.—Continued.

Name or number.	Type.	Displacement.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
Barge No. 29.....	300-ton barge.....	103.00	100 4 24	0	7 0	1916	Tuscaloosa,
Barge C.....	40-ton barge.....	16.00	54 0 18	0	3 0	1909	Pascagoula
Barge D.....	do.....	16.00	54 1 18	1	3 3	1909	do.....
Barge E.....	340-ton barge.....	104.00	91 0 27	2	8 0	1909	do.....
Barge G.....	do.....	104.00	91 0 27	2	8 0	1910	Gulfport, M.
Barge H.....	64-ton barge.....	23.00	54 0 18	0	4 0	1910	do.....
Barge J.....	40-ton barge.....	16.00	54 0 18	0	3 0	1911	Pascagoula
Barge K.....	42-ton barge.....	12.00	45 0 15	0	4 0	1912	do.....
Barge L.....	340-ton barge.....	104.00	91 0 27	2	8 0	1913	do.....
Barge M.....	63-ton barge.....	17.00	54 0 18	0	3 0	1914	do.....
Barge P.....	80-ton barge.....	35.00	62 0 18	0	4 9	1915	do.....

MONTGOMERY, ALA.

Caucus.....	Saagoing hopper dredge.....	1,980.00	200 0 41	0	23 2	1905	Greensport,
Pettus ¹	Stern-wheel hydraulic pipe-line dredge.....	488.00	135 0 35	0	6 6	1908	Gulfport, M.
Blackwater.....	Hydraulic pipe-line dredge.....	465.00	110 0 32	0	10 7	1911	Montgomery
Muscogee ²	do.....	309.00	120 0 30	0	7 6	1904	Pine Barren
Upatoi ³	Dipper dredge.....	212.00	85 0 30	0	6 0	1901	Bainbridge
Attalla ⁴	do.....	206.00	75 0 26	4	5 6	1902	Columbus,
Albany ⁵	Bucket dredge.....	75.00	70 0 30	0	4 9	1908	Lock 4, Coos
Wm. J. Twining.....	Stern-wheel steam snag boat.....	370.00	155 0 33	0	5 3	1881	Columbus,
Chattahoochee.....	do.....	233.00	163 0 27	0	4 0	1896	Mobile, Ala.
Flint ⁶	do.....	138.00	110 0 25	4	4 3	1914	Burdocks I
Choctawhatchee.....	do.....	197.00	90 0 22	0	3 6	1902-1903	Ala.
Escambia ⁷	do.....	112.00	92 0 25	0	4 0	1885	Pine Barren
Conecuh ⁸	Nonpropelling snag boat.....	37.00	60 0 20	0	3 0	1907	do.....
Geneva ⁹	do.....	50.00	64 0 22	6	4 4	1913	Montgomery
Alabama ¹⁰	Stern-wheel towboat.....	219.00	156 5 26	4	4 4	1913-1914	River Falls
Leota ¹¹	do.....	167.00	137 0 27	8	4 6	1888	Freeport, F
Columbus.....	do.....	231.00	154 0 28	0	4 0	1904	Pine Barren
Coosa.....	Gasoline towboat.....	123.00	95 0 18	6	4 9	1910-1911	Gadsden, A
Arrow.....	Gasoline launch.....	2.00	31 0 7	0	4 0	1910	Near Look

¹ Hull built at Gulfport, Miss.; cabin at Montgomery, Ala.² Formerly dredge No. 4.³ Rebuilt 1909-10, Columbus, Ga.; formerly dredge No. 1.⁴ Formerly dredge No. 3.

NOTE.—Barge I, listed last year, destroyed (authority Mar. 16, 1916; E. D. 79119/225). Barge J, listed last year, destroyed (authority Mar. 8, 1916; E. D. 79119/214).

ed in the Engineer Department at large on Dec. 31, 1916—Continued.

MOBILE, ALA.—Continued.

Purchased.						
Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
.....	Steel..	\$9,529.91	\$9,500.00	Good..	.....	Tombigbee River, Ala.
.....	Wood..	600.00	175.00	Fair...	\$0.86	Black Warrior, Warrior, and Tombigbee Rivers, Ala.
.....	do..	600.00	175.00	do..	.....	Tombigbee River, Ala.
.....	do..	3,649.00	2,200.00	do..	85.91	Harbors on coast of Mississippi.
.....	do..	4,100.00	2,600.00	do..	15.56	Mobile Harbor, Ala.
.....	do..	1,421.00	900.00	do..	381.74	Do.
.....	do..	890.00	200.00	do..	88.26	Tombigbee River, Ala. and Miss.
.....	do..	680.00	420.00	do..	.....	Mobile Harbor, Ala.
.....	do..	4,090.00	3,500.00	Good..	117.46	Gulfport Harbor, Miss.
.....	do..	765.86	650.00	do..	98.01	Mobile Harbor, Ala.
.....	do..	1,523.12	1,300.00	do..	68.54	Gulfport Harbor, Ship Island Pass, Pascagoula Harbor.

MONTGOMERY, ALA.

Greensport, L. I.	Wood.	\$150,000.00	\$160,000.00	Good..	\$2,050.94	Harbor at Pensacola, Fla.
.....	do..	62,352.25	45,000.00	do..	3,378.35	Alabama River, Ala.
.....	do..	63,289.23	60,125.00	do..	3,189.32	Narrows in Santa Rosa Sound, Fla.; Blackwater River, Fla., channel from Apalachicola River to St. Andrews Bay, Fla.
Bainbridge, Ga.	do..	12,900.00	10,900.00	do..	1,660.08	Chattahoochee River, Ga. and Ala.
.....	do..	15,717.74	13,800.00	do..	2,823.66	Do.
.....	do..	10,000.00	6,800.00	do..	1,109.15	Operating and care of canals, etc., Coosa River, Ga. and Ala.
.....	do..	11,730.84	7,900.00	Fair...	410.84	Flint River, Ga.
.....	do..	22,500.00	17,500.00	Good..	12,831.27	Alabama River, Ala.
.....	do..	12,000.00	12,900.00	do..	1,129.41	Chattahoochee River, Ga. and Ala.
.....	do..	4,500.00	13,825.00	do..	2,865.45	Flint River, Ga.
.....	do..	5,400.00	5,200.00	do..	1,991.03	Choctawhatchee River, Fla. and Ala.
.....	do..	3,500.00	3,250.00	do..	1,031.29	Escambia and Conecuh Rivers, Fla. and Ala.
.....	do..	1,250.00	1,000.00	do..	629.33	Do.
.....	do..	3,981.60	3,500.00	do..	667.72	Choctawhatchee River, Fla. and Ala.
Louisville, Ky.	do..	15,000.00	27,000.00	do..	2,907.01	Alabama River, Ala.
Gadsden, Ala.	do..	6,000.00	11,250.00	do..	523.17	Coosa River, Ga. and Ala., between Rome, Ga., and Lock 4, Ala.
Bainbridge, Ga.	do..	20,700.00	16,000.00	do..	357.25	Chattahoochee River, Ga. and Ala.
.....	do..	10,674.76	9,000.00	do..	1,525.95	Coosa River, Ga. and Ala., Locks and Dams Nos. 4 and 5.
.....	do..	1,960.00	1,600.00	do..	170.77	Harbor at Pensacola, Fla.

* Formerly dredge No. 5.

* Rebuilt 1914 at Pine Barren, Fla.

* Rebuilt 1909 at Pine Barren, Fla.

* Formerly barge No. 22, lifted up as hand-power snag boat 1910.

* Nonpropelling snag boat, placed in commission in 1913.

* Formerly John Mills; rebuilt 1914.

* Rebuilt 1903, at Lock, Ala.

TABLE III.—Statement of floating plant owned by the United States Army.

MONTGOMERY, ALA.—Continued.

Name or number.	Type.	Displacement.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
		Long tons.	Ft. in.	Ft. in.	Ft. in.		
Eufaula.....	Gasoline launch.....	0.75	27 6	7 3	2 4	1905	St. Joseph
Etowah.....	do.....	2.00	25 6	6 6	2 10	(¹)	Unknown.
Oostenaula.....	do.....	2.00	25 0	6 0	3 2	1911	St. Joseph
Vernon.....	do.....	1.00	15 0	4 0	1 9	1913	Racine, W.
Catoma.....	Kerosene launch.....	2.00	25 0	7 3	2 0	1907	St. Joseph
Santa Rosa.....	Auxiliary schooner.....	64.00	70 0	16 0	8 0	1908	Pensacola Yard.
Shearwater.....	Gasoline launch.....	4.00	40 0	8 0	6 0	1908	do.....
Coot.....	do.....	1.50	21 0	4 7	2 0	1911	Fort Pickens
Primary.....	do.....	1.25	18 5	5 0	2 0	1905	Greenport.
Sub Rosa.....	do.....	.80	14 0	4 0	1 8	1908	Pensacola Yard.
Chipola.....	do.....	7.00	42 0	8 6	7 0	1900	Apalachicola
No. 4 ²	Pile-driver barge.....	12.00	40 0	18 0	3 0	1904	Columbus, Ga.
No. 5 ²	do.....	12.00	40 0	18 0	3 0	1904	do.....
No. 11.....	do.....	30.00	80 0	22 0	4 2	1907	Mobile, Ala.
No. 17 ²	do.....	10.00	40 0	18 0	3 0	1904	Columbus, Ga.
No. 26 ²	do.....	10.00	40 0	18 0	3 0	1910	do.....
No. 15 ²	Clamshell derrick barge.....	30.00	80 0	22 0	4 2	1907	(Gulfport, La.) (Lock 3, Ala.)
No. 16 ²	Drilling barge.....	66.00	68 0	26 0	5 0	1903	Bainbridge, Ga.
No. 8.....	100-ton barge.....	30.00	80 0	22 0	4 2	1906	Mobile, Ala.
No. 18.....	10-ton barge.....		30 0	10 0	1 8	1903	Burlocks, Ala.
No. 19 ²	250-ton barge.....	82.00	125 0	28 0	5 2	1903	Bainbridge, Ga.
No. 20.....	do.....	82.00	125 0	28 0	5 2	1903	do.....
No. 21 ²	30-ton barge.....	17.50	40 0	18 0	3 0	1907	Columbus, Ga.
No. 23.....	110-ton barge.....	40.00	80 0	29 0	5 0	1894	Pensacola, Fla.
Nos. 25 to 39 ²	Pontoons.....	1.00	16 0	4 0	1 9	1909	Montgomery, Ala.
Letters A to U, inclusive (omitting letter I). ²	Steel pontoons.....		16 0	6 0	1 10	1915	Roanoke, Va.
Nos. 40 to 50, inclusive. ²	do.....		12 10	4 10	1 6	1915	Newnan, Ga.
No. 24.....	110-ton barge.....	35.00	72 0	27 0	5 0	1895	Pensacola, Fla.
No. 34.....	50-ton barge.....	18.00	50 0	20 0	4 0	1911	Mayos Bay, Ga.
No. 10.....	100-ton barge (creosoted).....	30.00	80 0	22 0	4 2	1907	Mobile, Ala.
No. 12.....	do.....	30.00	80 0	22 0	4 2	1907	do.....
No. 13.....	do.....	30.00	80 0	22 0	4 2	1907	do.....
No. 14.....	do.....	30.00	80 0	22 0	4 2	1907	Gulfport, La.
No. 27.....	300-ton barge (creosoted).....	82.00	124 0	28 0	7 0	1910	New Orleans, La.
No. 28.....	do.....	82.00	124 0	28 0	7 0	1910	do.....
No. 29.....	do.....	82.00	124 0	28 0	7 0	1910	do.....

¹ Unknown.² Rebuilt 1910, at Columbus, Ga.³ Formerly rock barge; pile-driver 1910, Columbus, Ga.; pile-driver machinery removed 1912.⁴ Pile-driver machinery removed 1912.

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

MONTGOMERY, ALA.—Continued.

When.	Purchased.		First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
	Where.	Material.					
1906	St. Joseph, Mich.	Wood.	\$686.00	\$850.00	..do..	\$20.40	Chattahoochee River, Ga. and Ala.
1910	Columbus, Ga.	..do..	178.08	475.00	..do..	22.06	Coosa River, Ga. and Ala., lock and dam at Mayos Bar, Ga.
1911	St. Joseph, Mich.	..do..	686.00	750.00	..do..	96.99	Coosa River, Ga. and Ala., Locks and Dams Nos. 4 and 5.
1912	Racine, Wis.	..do..	205.00	175.00	..do..	29.41	Choctawhatchee River, Fla. and Ala.
1907	St. Joseph, Mich.	..do..	1,225.00	700.00	..do..	357.91	Alabama River, Ala.
	Pensacola Navy Yard.	..do..	21,422.98	25,000.00	..do..	538.77	Harbor at Pensacola, Fla.
1912	..do..	..do..	900.00	2,200.00	..do..	89.48	Channel from Apalachicola River to St. Andrews Bay, Fla.
	..do..	..do..	387.00	275.00	..do..	5.04	Do.
1906	Greensport, L. I.	..do..	Unknown.	250.00	..do..		St. Andrews Bay, Fla., and St. Josephs Bay, Fla.
1908	Pensacola Navy Yard.	..do..			..do..		Harbor at Pensacola, Fla.
1916	Apalachicola, Fla.	..do..	500.00	1,000.00	..do..	298.39	Chattahoochee River, Ga. and Ala.
	..do..	..do..	375.00	600.00	..do..		Do.
	..do..	..do..	375.00	600.00	..do..	285.08	Do.
1907	Mobile, Ala.	..do..	2,975.00	1,000.00	..do..	288.98	Alabama River, Ala.
	..do..	..do..	300.00	350.00	Fair		Flint River, Ga.
	..do..	..do..	375.00	350.00	Good		Chattahoochee River, Ga. and Ala.
1907	Gulfport, Miss.	..do..	4,007.50	3,600.00	..do..	335.46	Operating and care of canals, etc., Coosa River, Ga. and Ala.
	..do..	..do..	2,960.00	3,750.00	..do..		Flint River, Ga.
1906	Mobile, Ala.	..do..	1,703.00	400.00	Poor		Alabama River, Ala.
	..do..	..do..	300.00		Worthless.		Flint River, Ga.
	..do..	..do..	4,000.00	3,700.00	Good		Chattahoochee River, Ga. and Ala.
	..do..	..do..	4,000.00	975.00	Fair		Do.
	..do..	..do..	450.00	550.00	Good		Do.
1896	Pensacola, Fla.	..do..	1,350.00	475.00	Fair		National defense (war), gun and mortar batteries.
	..do..	..do..					Alabama River, Ala.
1915	Roanoke, Va.	Steel.	57.00	20.00	Poor		Do.
	..do..	..do..	99.90	95.00	Good		
1915	Newman, Ga.	..do..	79.10	75.00	..do..		Chattahoochee River, Ga. and Ala.
1906	Pensacola, Fla.	Wood.	1,350.00	475.00	Fair		National defense (war), gun and mortar batteries.
	..do..	..do..	499.37	475.00	Good		Coosa River, Ga. and Ala., lock and dam at Mayos Bar, Ga.
1907	Mobile, Ala.	..do..	2,975.00	1,750.00	..do..		Alabama River, Ala.
1907	..do..	..do..	2,975.00	1,750.00	..do..		Do.
1907	..do..	..do..	2,975.00	1,750.00	..do..		Do.
1907	Gulfport, Miss.	..do..	4,007.50	3,600.00	..do..		Operating and care of canals, etc., Coosa River, Ga. and Ala.
1910	New Orleans, La.	..do..	4,151.60	3,600.00	..do..		Alabama River, Ala.
1910	..do..	..do..	4,151.60	3,600.00	..do..		Do.
1910	..do..	..do..	4,281.44	3,800.00	..do..		Chattahoochee River, Ga. and Ala.

* Framed and crosscoated, Gulfport, Miss.; completed at Lock 3, Ala.

* Rebuilt 1910, Columbus, Ga.

* Rebuilt 1908, Apalachicola, Fla.

* Each.

TABLE III.—Statement of floating plant owned by the United States and
MONTGOMERY, ALA.—Continued.

Name or number.	Type.	Dis- place- ment.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
No. 30.....	300-ton barge (creosoted)	Long tons.	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>		
		82.00	124 0	28 0	7 0	1910	New Orleans, La....
No. 32.....	do.....	92.50	130 0	26 0	6 0	1911	Near Lock 3, Coosa River.
No. 33 ¹	do.....	92.50	130 0	26 0	6 0	1911	Lock 3, Ala.....
No. 31.....	300-ton barge.....	87.00	125 0	28 0	7 0	1910	Columbus, Ga.....
No. 1.....	Quarter boat.....	28.00	50 0	20 0	3 7	1906	Mobile, Ala.....
No. 43.....	70-ton barge.....	70.00	100 0	26 0	5 3	1913	Pine Barren, Fla.....
No. 44.....	do.....	70.00	100 0	26 0	5 3	1913	do.....
No. 45.....	80-ton barge.....	40.00	80 0	24 0	4 0	1915	Apalachicola, Fla.....
No. 46 ¹	Drilling barge.....	40.00	80 0	24 0	4 0	1915	do.....
No. 42.....	140-ton barge.....	45.00	80 0	22 0	5 0	1912	Mayos Bar, Ga.....
No. 2.....	Quarter boat.....	23.00	50 0	20 0	3 7	1906	Mobile, Ala.....
No. 3.....	do.....	26.00	60 0	16 0	2 0	1907	River Falls, Ala.....
No. 4.....	do.....	48.00	70 0	21 6	3 0	1907	Columbus, Ga.....
No. 25 ¹	do.....	120.00	80 0	29 0	5 0	1894	Pensacola, Fla.....
Thronateesaka ⁴	do.....	54.00	75 0	26 0	4 6	1903	Bainbridge, Ga.....
No. 36.....	79-ton barge.....	79.00	60 0	32 0	4 0	1912	Pine Barren, Fla.....
No. 37.....	128-ton barge.....	128.00	88 0	32 0	8 0		Pensacola Navy Yard.
No. 38.....	do.....	128.00	88 0	32 0	8 0		do.....
No. 39.....	do.....	128.00	88 0	32 0	8 0		do.....
No. 40.....	162-ton barge.....	162.00	105 0	32 0	8 0		do.....
No. 41.....	98-ton barge.....	98.00	90 0	30 0	6 0	1912	New Orleans, La.....
Barge.....	Hull of old steamboat.....						

NASHVILLE, TENN.

Sevier.....	Dipper dredge.....	200.00	80 0	30 0	7 0	1903	Jeffersonville, Ind.....
No. 1.....	Snag boat.....	67.00	89 6	25 0	3 4	1910	Lock 7, Cumberland River.
Warioto.....	Stern-wheel towboat.....	235.00	141 0	27 0	5 1	1915	Dubuque, Iowa.....
John.....	do.....	32.00	100 6	18 9	3 3	1903	Jeffersonville, Ind.....
Henry.....	do.....	34.00	101 3	18 6	2 1	1903	do.....
Endora.....	Gasoline launch (screw).....	1.00	21 8	6 5	2 3	1913	Salem, Ohio.....
Harpeth.....	do.....	1.25	26 4	6 1	2 3	1913	Leavenworth, Ind.....
Mansker.....	do.....	.50	20 0	4 9	1 7	1913	Lock 7, Cumberland River.
No. 1.....	Gasoline tender.....	56.25	86 3	19 2	1 6	1910	Lock 3, Cumberland River.
No. 3.....	Derrick boat.....	144.00	80 6	30 4	4 6	1909	Lock 4, Cumberland River.
No. 4.....	do.....	43.30	70 0	32 0	4 7	1912	Lock A, Cumberland River.
No. 5.....	do.....	43.30	90 0	32 0	4 7	1913	do.....
No. 1.....	Quarter boat.....	23.00	60 10	18 6	2 6	1908	Lock 2, Cumberland River.
No. 2.....	do.....	30.00	65 0	14 0	2 6	1907	do.....
No. 3.....	do.....	22.00	60 9	14 0	3 3	1913	Lock 21, Cumberland River.
No. 4.....	do.....	24.70	61 0	18 0	3 2	1915	Lock A, Cumberland River.

¹ Built by U. S. Engineer Department.² Formerly 80-ton barge; converted into drilling barge 1915.³ Formerly with dredging outfit; machinery removed and barge converted into quarter boat 1910.⁴ Formerly snag boat with capstan; rebuilt at Pine Barren, Fla., 1914.

d in the Engineer Department at large on Dec. 31, 1916—Continued.

MONTGOMERY, ALA.—Continued.

Purchased.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Where.						
New Orleans, La.	Wood.	\$4,251.44	\$3,500.00	Good.		Chattahoochee River, Ga. and Ala.
.....	do.	6,377.88	6,000.00	do.		Coosa River, Ga. and Ala., Locks and Dams Nos. 4 and 5.
.....	do.	6,750.00	6,500.00	do.		Do.
.....	do.	9,165.98	8,500.00	do.		Chattahoochee River, Ga. and Ala.
Mobile, Ala.	do.	1,590.00	300.00	Poor.		Alabama River, Ala.
.....	do.	6,855.33	6,620.00	Good.		Do.
.....	do.	6,855.33	6,620.00	do.		Do.
Apalachicola, Fla.	do.	2,750.00	2,750.00	do.	\$217.32	Flint River, Ga.
.....	do.	2,750.00	3,100.00	do.		Do.
.....	do.	2,421.15	1,850.00	do.		Coosa River, Ga. and Ala., lock and dam at Mayos Bar, Ga.
Mobile, Ala.	do.	1,590.00	325.00	Poor.		Alabama River, Ala.
.....	do.	1,000.00	475.00	do.		Escambia and Conecuh Rivers, Fla. and Ala.
.....	do.	2,500.00	1,600.00	Fair.		Chattahoochee River, Ga. and Ala.
Pensacola, Fla.	do.	1,850.00	2,800.00	do.		Gun and mortar batteries, Pensacola, Fla.
Mainbridge, Ga.	do.	7,460.00	5,000.00	Good.		Flint River, Ga.
.....	do.	4,347.03	4,100.00	do.		Channel from Apalachicola River to St. Andrews Bay, Fla.
Pensacola Navy Yard.	do.	7,000.00	3,325.00	do.		St. Andrews Bay, Fla.
.....	do.	7,000.00	3,750.00	do.		R. & P. defenses, Pensacola, Fla., sea walls and buildings.
.....	do.	7,000.00	3,750.00	do.		Do.
.....	do.	8,000.00	4,750.00	do.		Do.
.....	do.	4,861.13	4,600.00	do.		Channel from Apalachicola River to St. Andrews Bay, Fla.

NASHVILLE, TENN.

.....	Wood.	\$18,650.00	\$5,504.00	(*)	\$264.52	Cumberland River.
.....	do.	3,018.27	1,327.00	Fair.		Do.
.....	(*)	36,525.00	32,873.00	Good.	650.91	Do.
.....	Wood.	4,535.00	3,120.00	Fair.	1,158.63	Do.
.....	do.	4,535.00	2,415.00	do.	563.69	Do.
Nashville, Tenn.	do.	300.00	174.00	do.		Do.
Wesley, Ohio.	Steel.	1,285.00	746.00	do.	91.57	Do.
Leavenworth, Ind.	Wood.	173.80	99.00	do.	9.65	Do.
.....	do.	3,918.51	1,077.00	do.		Do.
.....	do.	5,500.00	1,192.00	do.		Do.
.....	do.	6,267.86	4,462.00	Good.	90.83	Do.
.....	do.	7,267.86	4,120.00	do.	24.50	Do.
.....	Unknown.		50.00	Poor.		Do.
.....	do.	1,198.71	50.00	do.		Do.
.....	do.	1,282.78	722.00	Fair.		Do.
.....	do.	1,591.84	1,293.00	Good.	27.83	Do.

worthless; machinery good.
and wood.
united iron.

TABLE III.—Statement of floating plant owned by the United States Army.

NASHVILLE, TENN.—Continued.

Name or number.	Type.	Displacement.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
		Long tons.	Ft. in.	Ft. in.	Ft. in.		Where.
No. 5.....	80 cubic-yard dump scow.	82.00	73 7	20 8	5 9	1916	Lock A, Cu River.
No. 6.....	do.....	82.00	73 7	20 8	5 9	1915	do.....
No. 6.....	Barge, 112-ton.....	34.00	80 0	18 0	4 0	1914	do.....
No. 6.....	do.....	35.00	89 9	18 0	4 0	1914	do.....
No. 7.....	Barge, 180-ton.....	60.00	100 0	22 0	5 0	1909	Lock 3, Cu River.
No. 8.....	do.....	60.00	100 0	22 0	5 0	1909	do.....
No. 10.....	do.....	60.00	100 0	22 0	5 0	1909	Muscle Sho Tennessee.
No. 13.....	Barge, 200-ton.....	58.60	100 0	22 0	5 0	1911	Lock A, Cu River.
No. 14.....	do.....	58.60	100 0	22 0	5 0	1911	do.....
No. 15.....	do.....	58.60	100 0	22 0	5 0	1912	do.....
No. 16.....	do.....	58.60	100 0	22 0	5 0	1912	do.....
No. 17.....	Barge, 90-ton.....	25.80	50 0	20 0	5 0	1912	do.....

NEW LONDON, CONN.

Ellis.....	Gasoline launch (screw).....	7.50	33 0	9 2	3 1	1911	Marblehead.
Katharine.....	do.....	2.50	30 5	7 11	3 11	1909	South Norw.
Pequot.....	do.....	2.50	28 3	7 4	4 6	1912	New London.

NEW ORLEANS, LA.

Benysaurd.....	(Hydraulic pipe-line) dredge.....	2,978.00	271 6	47 6	23 0	1900	Richmond.
New Orleans.....	do.....	4,425.00	315 0	50 0	26 0	1904	Norfolk, Va.
Delatour.....	Hydraulic pipe-line dredge and snag boat.....	390.00	112 0	30 0	5 0	1912	Quincy, Mo.
Grossetete.....	Bucket dredge.....	258.00	80 4	34 2	5 0	1913	Jeffersonville.
Pigeon ¹	Snag boat.....	65.00	60 0	30 6	6 0	(3)	New Orleans.
Tonty ²	Steam yacht.....	123.00	98 0	16 0	5 6	1836	Moss Point.
General Reese.....	Steam launch.....	29.00	48 0	13 6	5 0	1876	New Orleans.
C. Donovan.....	Steam tug.....	130.00	95 0	20 10	10 0	1895	Newport.
Uachs ³	do.....	43.00	62 0	14 0	7 6	1878	Philadelphia.
Picket.....	Survey boat (steam).....	32.00	52 5	12 6	6 3	1905	New Orleans.
Hyacinth ³	Steamboat (paddle).....	73.00	102 6	18 0	2 6	1894	do.....
Stadla.....	Gasoline launch.....	5.00	30 4	6 7	2 11	1894	New York.
Amite.....	do.....	1.21	20 11	4 6	2 9	1912	New Orleans.
Boeuf.....	do.....	1.00	14 0	4 5	2 8	1913	do.....
Salvador.....	do.....	13.30	41 0	9 6	4 0	1906	Muskegon.
Maurepas.....	do.....	15.00	36 6	10 6	4 0	1915	Piaquemine, La.
Calcasieu.....	do.....	5.60	37 8	10 7	4 0	1915	do.....
Intracoastal.....	Quarter boat.....	57.90	65 6	22 6	4 5	1914	New Orleans.
Lacassine.....	do.....	9.40	30 0	15 0	3 4	1915	Piaquemine.

¹ Formerly barge No. 23; changed to steam derrick No. 2. Machinery installed in 1914 at Ft. La., at a cost of \$1,700. Rebuilt in 1915 at Keystone Lock, and then used as a derrick barge.

² Unknown.

oyed in the Engineer Department at large on Dec. 31, 1916—Continued.

NASHVILLE, TENN.—Continued.

Purchased.					Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Where.	Material.	First cost.	Estimated value.	Condition.		
.....	Wood..	\$2,542.53	\$2,035.00	Good..	.....	Cumberland River.
.....	do...	2,862.19	2,481.00	do...	.....	Do.
.....	do...	1,652.04	1,135.00	do...	.....	Do.
.....	do...	1,717.43	1,177.00	do...	.....	Do.
.....	do...	2,332.16	100.00	Poor..	.....	Do.
.....	do...	2,592.29	100.00	do...	.....	Do.
.....	do...	2,569.30	25.00	do...	.....	Do.
.....	do...	3,046.11	952.00	Fair..	.....	Do.
.....	do...	3,046.11	952.00	do...	.....	Do.
.....	do...	3,020.67	1,320.00	do...	.....	Do.
.....	do...	2,661.86	1,164.00	Good..	.....	Do.
.....	do...	1,843.34	807.00	Fair..	.....	Do.

NEW LONDON, CONN.

Boston, Mass....	Wood..	\$2,100.00	.....	Good..	\$844.61	River and harbor.
Darien, Conn.....	do...	775.00	.....	Fair..	279.01	Do.
New London, Conn....	do...	1,300.00	.....	Good..	153.34	Do.

NEW ORLEANS, LA.

.....	Steel..	\$414,238.37	\$230,000.00	Good..	\$10,660.96	Southwest Pass, Mississippi River.
.....	do...	520,101.69	475,000.00	do...	17,283.78	Do.
.....	Wood..	35,566.86	28,000.00	Fair..	1,809.27	Various works in New Orleans (La.) district.
.....	do...	16,951.07	15,000.00	Good..	3,982.90	Do.
New Orleans, La.	do...	3,050.00	3,500.00	do...	508.35	Do.
New York, N.Y.	Steel..	18,900.00	15,700.00	do...	1,234.98	Passes of Mississippi River.
.....	Wood..	3,500.00	900.00	Fair..	471.27	South Pass, Mississippi River.
Punta Gorda, Fl..	Steel..	29,000.00	26,000.00	Good..	828.71	Southwest Pass, Mississippi River.
Port Eads, La...	Iron...	10,000.00	6,250.00	do...	1,056.04	South Pass, Mississippi River.
.....	Wood..	7,189.00	4,500.00	Fair..	421.72	Southwest Pass, Mississippi River.
Patterson, La...	do...	8,000.00	7,200.00	do...	877.17	Removing water hyacinths in Mississippi, Louisiana, and Texas.
New York, N.Y.	do...	1,844.50	600.00	Good..	4.00	Schooner Bayou Lock, La.
New Orleans, La.	do...	500.00	300.00	do...	46.74	Removing water hyacinths in Mississippi, Louisiana, and Texas.
.....	do...	325.00	310.00	do...	.....	Do.
Morgan City, La.	Steel..	1,700.00	1,400.00	do...	38.79	Bayou Plaquemine, La.
.....	Wood..	2,115.16	2,000.00	do...	32.40	Various works; tender to the U. S. dredge Delatour.
.....	do...	2,193.00	2,000.00	do...	56.64	Various works; tender to the U. S. dredge Grossette.
.....	do...	3,757.00	3,400.00	Fair..	.....	Various works in New Orleans (La.) district.
.....	do...	578.00	548.00	Good..	.....	Do.

merly No. 150372, Chere Amie. Hull rebuilt in New Orleans, La., in 1905, and new boiler and installed in 1913.

merly No. 115599, Startle. New boiler installed in 1913 at New Orleans, La.
uilt in 1906 at New Orleans, La.

TABLE III.—Statement of floating plant owned by the United States Army.

NEW ORLEANS, LA.—Continued.

Name or number.	Type.	Displacement.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
		Long tons.	Ft. in.	Ft. in.	Ft. in.		Where.
Choupique.....	Quarter boat.....	75.00	67 8	23 6	4 3	1916	Keystone L (Bayou T
No. 1 ¹	Steam pile driver.....	71.00	55 0	25 0	4 0	1896	Port Eads,
No. 2.....	Steam pile driver and derrick.	127.00	75 6	30 0	5 0	1910	Westlake, L
No. 1 ²	Steam derrick.....	78.00	63 0	24 0	5 0	1903	Port Eads,
Chene ³	Spraying barge.....	25.00	50 0	16 0	4 0	1915	Keystone L
No. 1.....	Fuel barge.....	63.00	50 0	20 0	4 2	1914	New Orlean
No. 2.....	do.....	28.00	50 0	20 0	5 0	1915	Keystone L
No. 3.....	do.....	35.40	50 0	22 0	5 0	1912	Moss Point,
No. 5 ⁴	do.....	27.00	40 8	14 3	5 0	1912	Plaquemine
No. 6.....	do.....					1916	Keystone L
No. 6.....	60-ton barge.....	55.00	100 0	22 0	5 0	1905	New Orlean
No. 9.....	do.....	55.00	100 0	22 0	5 0	1905	Madisonvill
No. 10.....	do.....	55.00	100 0	22 0	5 0	1905	do.....
No. 11.....	do.....	55.00	100 0	22 0	5 0	1906	do.....
No. 13.....	213-ton barge.....	137.00	90 0	27 0	8 0	1904	Pearlington
No. 14.....	do.....	137.00	90 0	27 0	8 0	1904	do.....
No. 15.....	do.....	126.00	90 0	27 0	8 0	(⁵)	(⁵)
No. 16.....	60-ton barge.....	55.00	100 0	22 0	5 0	1910	New Orlean
No. 17.....	154-ton barge.....	80.00	100 0	22 0	5 6	1910	do.....
No. 18.....	do.....	80.00	100 0	22 0	5 6	1910	do.....
No. 19.....	do.....	80.00	100 0	22 0	5 6	1910	do.....
No. 20.....	do.....	80.00	100 0	22 0	5 6	1910	do.....
No. 21.....	60-ton barge.....	55.00	100 0	22 0	5 0	1910	do.....
No. 22.....	do.....	55.00	100 0	22 0	5 0	1910	do.....
No. 24.....	80-ton barge.....	80.00	100 0	24 0	6 0	(⁵)	do.....
No. 26.....	60-ton barge.....	55.00	100 0	22 0	5 0	1915	do.....
No. 27.....	do.....	55.00	100 0	22 0	5 0	1915	do.....

NEW ORLEANS, LA. (FOURTH MISSISSIPPI RIVER DISTRICT).

The Ram.....	Self-propelled hydraulic pipe-line dredge.	419.00	125 0	30 0	7 6	1893	Jeffersonvill
Barataria.....	Levee-building machine.	302.00	102 0	36 0	6 0	1908	New Orlean
Buras.....	do.....	341.00	110 0	40 0	7 3	1914	do.....
Beauregard.....	do.....	442.00	110 0	42 0	7 6	1915	do.....
Gen. John Newton.....	Sternwheel towboat.....	221.00	175 0	24 0	7 6	1899	Dubuque, I
Plaquemine.....	do.....	300.00	136 0	29 6	5 6	1910	Jeffersonvill
Lafourche.....	do.....	300.00	136 0	29 6	5 6	1911	New Orlean
Chalmette.....	do.....	132.00	105 0	21 0	5 0	1915	Jeffersonvill
Teche.....	do.....	90.00	100 0	20 4	5 0	1911	do.....
Tensas.....	do.....	73.00	93 6	20 4	4 6	1905	Chicago, Ill
Ticklaw.....	Tugboat.....	217.00	94 0	20 4	10 0	1900	Philadelphia
Morganza.....	do.....	190.00	94 0	20 4	10 3	1892	do.....
Tunica.....	do.....	205.00	90 0	20 4	9 8	1898	Baltimore, M
Marengo.....	do.....	137.00	80 0	18 2	8 8	1892	do.....
Manchac.....	do.....	113.00	78 0	17 0	7 6	1886	Paducah, K

¹ Rebuilt in 1910 at New Orleans, La.² Rebuilt in 1903 at New Orleans, La.

ed in the Engineer Department at large on Dec. 31, 1916—Continued.

NEW ORLEANS, LA.—Continued.

Purchased.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Where.						
	Wood.	\$3,000.00	\$3,000.00	Good..		Various works in district; auxiliary to dredge Grossetete.
	do.	5,457.47	2,000.00	Fair..	\$127.92	South Pass, Mississippi River.
	do.	9,192.00	6,700.00	Good..	652.25	Southwest Pass, Mississippi River.
	do.	3,550.00	2,000.00	Fair..	673.06	South Pass, Mississippi River.
	do.	791.00	700.00	Good..		Removing water hyacinths in Louisiana.
	do.	591.00	475.00	do.		Various works; dredge Grossetete.
	do.	909.00	850.00	do.	13.00	Various works; dredge Delatour.
New Orleans, La.	do.	1,242.50	1,000.00	Fair..	73.37	Auxiliary to dredge Delatour. Various works in district.
Florence, Miss.	do.	450.00		(*)		Various works in New Orleans (La.) district.
	do.	700.00	700.00	Good..		Do.
	do.	2,250.00	1,600.00	Fair..		South Pass, Mississippi River.
	do.	2,800.00	1,300.00	do.		Do.
	do.	2,800.00	(*)	(*)		Do.
	do.	2,800.00	(*)	(*)		Do.
New Orleans, La.	do.	4,500.00	500.00	Very poor.	68.59	Southwest Pass, Mississippi River.
	do.	4,500.00	200.00	do.		Do.
	do.	5,000.00	200.00	do.		Do.
	do.	2,410.50	900.00	Fair..		South Pass, Mississippi River.
	do.	2,410.50	1,850.00	Good..	618.24	Southwest Pass, Mississippi River.
	do.	2,410.50	1,850.00	do.	321.75	Do.
	do.	2,410.50	1,900.00	do.	284.28	Do.
	do.	2,410.50	1,900.00	do.	468.41	Do.
	do.	2,462.40	1,400.00	Fair..	13.56	South Pass, Mississippi River.
	do.	2,462.40	1,400.00	do.		Do.
New Orleans, La.	do.	1,200.00	(*)	(*)		Southwest Pass, Mississippi River.
	do.	2,824.80	2,250.00	Good..		South Pass, Mississippi River.
	do.	2,824.80	2,250.00	do.		Do.

NEW ORLEANS, LA. (FOURTH MISSISSIPPI RIVER DISTRICT).

	Steel..	\$69,500.00	\$40,000.00	Good..	\$3,777.48	Improving Atchafalaya and Red Rivers, etc., Louisiana.
	Wood.	22,000.00	18,000.00	do.	11,498.46	Improving Mississippi River, fourth district.
	do.	37,180.00	31,000.00	do.	4,300.00	Do.
	do.	44,850.00	40,000.00	do.	1,928.50	Do.
	Steel..	28,138.00	14,300.00	do.	3,061.00	Do.
	do.	38,700.00	32,800.00	do.	1,488.00	Do.
	do.	39,000.00	33,200.00	do.	1,084.00	Do.
	do.	19,425.00	19,000.00	do.	859.00	Do.
	do.	16,850.00	14,400.00	do.	2,180.00	Do.
	do.	11,120.00	7,400.00	do.	874.00	Do.
New York, N. Y.	do.	29,500.00	25,000.00	do.	4,097.00	Do.
	do.	30,000.00	24,000.00	Fair..	1,501.00	Do.
Baltimore, Md.	do.	22,000.00	15,000.00	Good..	1,839.00	Do.
	do.	15,000.00	10,000.00	do.	1,457.00	Do.
Paducah, Ky.	Wood.	6,555.00	2,000.00	do.	999.00	Do.

* Formerly spraying barge No. 1.

* Formerly quarter boat No. 1.

* Held for condemnation.

* Unknown.

TABLE III.—Statement of floating plant owned by the United States and
NEW ORLEANS, LA. (FOURTH MISSISSIPPI RIVER DISTRICT)—Continued.

Name or number.	Type.	Dis- place- ment.	Dimensions.			When.	Buft. Where.
			Length.	Beam.	Depth.		
		<i>Long tons.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>		
No. 1.....	Hydraulic grader.....	236.00	124 0	30 0	7 7	1900	New Orleans, La....
No. 2.....	do.....	236.00	124 0	30 0	7 7	1910	do.....
Derrick No. 1.....	Floating steam derrick.....	142.00	100 0	30 0	4 9	1908	do.....
Derrick No. 2.....	do.....	128.00	100 0	30 0	4 9	1910	do.....
Derrick No. 3.....	do.....	128.00	100 0	30 0	4 9	1912	do.....
Paver No. 1.....	Floating concrete mixer.....	367.00	124 0	30 0	7 7	1915	do.....
Beatrice.....	Gasoline launch.....	2.80	30 0	6 6	3 2	1906	St. Louis, Mo.....
Neptune.....	do.....	3.30	32 0	5 4	3 6	1913	New Orleans, La....
New Orleans.....	Quarter boat.....	237.00	166 0	30 0	4 3	1890	do.....
Natchez.....	do.....	198.00	140 0	30 0	4 0	1908	do.....
Baton Rouge.....	do.....	198.00	140 0	30 0	4 0	1910	do.....
St. Joseph.....	do.....	198.00	140 0	30 0	4 0	1910	do.....
Bavou Goula.....	do.....	198.00	140 0	30 0	4 0	1911	do.....
Bavou Sara.....	do.....	198.00	140 0	30 0	4 0	1911	do.....
Port Hudson.....	do.....	68.00	80 0	22 0	4 4	1911	do.....
Torras.....	do.....	68.00	80 0	22 0	4 4	1911	do.....
Lake Borgne.....	do.....	68.00	80 0	22 0	4 4	1910	do.....
Oiga.....	do.....	68.00	80 0	22 0	4 4	1914	do.....
Donaldsonville.....	do.....	187.00	100 0	30 0	4 0	1915	do.....
Dry dock.....	Floating, ordinary type.....	225.00	103 0	30 0	8 0	1912	do.....
Cement barge No. 1.....	Floating warehouse.....	108.00	124 0	30 0	7 7	1915	do.....
Cement barge No. 2.....	do.....	108.00	124 0	30 0	7 7	1915	do.....
Barge No. 1.....	Decked barge.....	98.00	124 0	30 0	7 7	1908	do.....
Barge No. 2.....	do.....	98.00	124 0	30 0	7 7	1908	do.....
Barge No. 3.....	do.....	98.00	124 0	30 0	7 7	1908	do.....
Barge No. 4.....	do.....	98.00	124 0	30 0	7 7	1910	do.....
Barge No. 5.....	do.....	98.00	124 0	30 0	7 7	1904	Pascagoula, Miss....
Barge No. 6.....	do.....	98.00	124 0	30 0	7 7	1904	do.....
Barge No. 7.....	do.....	98.00	124 0	30 0	7 7	1904	do.....
Barge No. 8.....	do.....	98.00	124 0	30 0	7 7	1903	New Orleans, La....
Barge No. 9.....	do.....	98.00	124 0	30 0	7 7	1904	Pascagoula, Miss....
Barge No. 10.....	do.....	98.00	124 0	30 0	7 7	1900	Elizabeth, Pa.....
Barge No. 11.....	do.....	98.00	124 0	30 0	7 7	1900	do.....
Barge No. 12.....	do.....	98.00	124 0	30 0	7 7	1903	Pascagoula, Miss....
Barge No. 13.....	do.....	98.00	124 0	30 0	7 7	1900	Elizabeth, Pa.....
Barge No. 14.....	do.....	98.00	124 0	30 0	7 7	1910	New Orleans, La....
Barge No. 15.....	do.....	98.00	124 0	30 0	7 7	1910	do.....
Barge No. 16.....	do.....	98.00	124 0	30 0	7 7	1910	do.....
Barge No. 17.....	do.....	98.00	124 0	30 0	7 7	1910	do.....
Barge No. 18.....	do.....	98.00	124 0	30 0	7 7	1910	do.....
Barge No. 19.....	do.....	98.00	124 0	30 0	7 7	1906	do.....
Barge No. 20.....	do.....	98.00	124 0	30 0	7 7	1908	do.....
Barge No. 21.....	do.....	98.00	124 0	30 0	7 7	1908	do.....
Barge No. 22.....	do.....	98.00	124 0	30 0	7 7	1907	do.....
Barge No. 23.....	do.....	98.00	124 0	30 0	7 7	1907	do.....
Barge No. 24.....	do.....	98.00	124 0	30 0	7 7	1907	do.....
Barge No. 25.....	do.....	98.00	124 0	30 0	7 7	1908	do.....
Barge No. 26.....	do.....	98.00	124 0	30 0	7 7	1908	do.....
Barge No. 27.....	do.....	98.00	124 0	30 0	7 7	1907	do.....
Barge No. 28.....	do.....	98.00	124 0	30 0	7 7	1910	do.....
Barge No. 29.....	do.....	98.00	124 0	30 0	7 7	1911	do.....
Barge No. 30.....	do.....	98.00	124 0	30 0	7 7	1910	do.....
Barge No. 31.....	do.....	98.00	124 0	30 0	7 7	1912	Ambridge, Pa.....
Barge No. 32.....	do.....	98.00	124 0	30 0	7 7	1912	do.....
Barge No. 33.....	do.....	98.00	124 0	30 0	7 7	1903	Pascagoula, Miss....
Barge No. 34.....	do.....	98.00	124 0	30 0	7 7	1903	do.....
Barge No. 35.....	do.....	98.00	124 0	30 0	7 7	1903	do.....
Barge No. 36.....	do.....	98.00	124 0	30 0	7 7	1904	do.....
Barge No. 37.....	do.....	98.00	124 0	30 0	7 7	1904	do.....
Barge No. 38.....	do.....	98.00	124 0	30 0	7 7	1904	do.....
Barge No. 39.....	do.....	98.00	124 0	30 0	7 7	1904	do.....
Barge No. 40.....	do.....	98.00	124 0	30 0	7 7	1904	do.....
Barge No. 41.....	do.....	98.00	124 0	30 0	7 7	1904	do.....
Barge No. 42.....	do.....	98.00	124 0	30 0	7 7	1908	New Orleans, La....
Barge No. 43.....	do.....	98.00	124 0	30 0	7 7	1907	do.....
Barge No. 44.....	do.....	98.00	124 0	30 0	7 7	1907	do.....
Barge No. 45.....	do.....	98.00	124 0	30 0	7 7	1908	do.....
Barge No. 46.....	do.....	98.00	124 0	30 0	7 7	1908	do.....
Barge No. 47.....	do.....	98.00	124 0	30 0	7 7	1908	do.....

ed in the Engineer Department at large on Dec. 31, 1916—Continued.

NEW ORLEANS, LA. (FOURTH MISSISSIPPI RIVER DISTRICT)—Continued.

Purchased.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Where.						
	Wood.	\$23,880.00	\$12,600.00	Fair...	\$1,362.00	Improving Mississippi River, fourth district.
	do.	24,212.00	18,400.00	Good..	269.00	Do.
	do.	7,500.00	5,100.00	do.	192.00	Do.
	do.	5,583.00	4,300.00	do.	278.60	Do.
	do.	6,280.00	5,300.00	do.	376.00	Do.
	do.	12,684.00	10,800.00	do.	76.64	Do.
	do.	1,750.00	200.00	Fair...	134.98	Do.
Stauffer, Eshleman & Co.	do.	1,800.00	400.00	do.	826.89	Do.
	do.	10,000.00	5,000.00	Good..	801.00	Do.
	do.	9,000.00	6,200.00	do.	207.00	Do.
	do.	10,000.00	8,000.00	do.	520.00	Do.
	do.	10,000.00	8,000.00	do.		Do.
	do.	10,000.00	8,200.00	do.	275.00	Do.
	do.	10,000.00	8,200.00	do.	453.00	Do.
	do.	3,500.00	2,800.00	do.	134.00	Do.
	do.	3,500.00	2,800.00	do.	238.00	Do.
	do.	3,500.00	2,600.00	do.	68.00	Do.
	do.	3,500.00	3,200.00	do.	54.00	Do.
	do.	9,373.00	9,000.00	do.	24.00	Do.
	do.	5,000.00	4,200.00	do.		Do.
	do.	5,104.00	4,900.00	do.	42.00	Do.
	do.	5,104.00	4,900.00	do.	58.00	Do.
	do.	4,250.00	3,000.00	do.	360.00	Do.
	do.	4,250.00	3,000.00	do.	91.00	Do.
	do.	4,250.00	3,000.00	do.	1,055.00	Do.
	do.	4,400.00	3,400.00	do.	37.00	Do.
	do.	4,400.00	2,300.00	do.	37.00	Do.
	do.	4,400.00	2,300.00	do.	20.00	Do.
	do.	4,400.00	2,300.00	do.	170.00	Do.
	do.	4,400.00	2,000.00	do.	33.00	Do.
	do.	4,400.00	2,300.00	do.	69.00	Do.
	do.	3,800.00	1,400.00	Fair...	719.00	Do.
	do.	3,800.00	1,400.00	do.	1,608.00	Do.
	do.	4,000.00	2,000.00	Good..		Do.
	do.	3,800.00	1,400.00	Fair...	571.00	Do.
	do.	4,400.00	3,400.00	Good..	425.00	Do.
	do.	4,400.00	3,400.00	do.	78.00	Do.
	do.	4,400.00	3,400.00	do.	511.00	Do.
	do.	4,400.00	3,400.00	do.	363.00	Do.
	do.	4,400.00	3,400.00	do.	4.00	Do.
	do.	4,675.00	2,700.00	do.		Do.
	do.	4,250.00	3,000.00	do.	66.00	Do.
	do.	4,250.00	3,000.00	do.	116.00	Do.
	do.	4,725.00	3,100.00	do.	77.00	Do.
	do.	4,725.00	3,100.00	do.	83.00	Do.
	do.	4,725.00	3,100.00	do.	134.00	Do.
	do.	4,250.00	3,000.00	do.	99.00	Do.
	do.	4,675.00	2,800.00	do.	16.00	Do.
	do.	4,725.00	3,100.00	do.	86.00	Do.
	do.	4,400.00	3,400.00	do.	213.00	Do.
	do.	4,000.00	3,200.00	do.	229.00	Do.
	do.	4,400.00	3,400.00	do.	19.00	Do.
Steel..	do.	7,950.00	7,000.00	do.	767.00	Do.
do.	do.	7,950.00	7,000.00	do.	865.00	Do.
Wood..	do.	4,000.00	2,000.00	do.	25.00	Do.
do.	do.	4,000.00	2,000.00	do.	574.00	Do.
do.	do.	4,000.00	2,000.00	do.	22.00	Do.
do.	do.	4,400.00	2,300.00	do.	23.00	Do.
do.	do.	4,000.00	2,000.00	do.	24.00	Do.
do.	do.	4,400.00	2,300.00	do.	20.00	Do.
do.	do.	4,400.00	2,300.00	do.	110.00	Do.
do.	do.	4,000.00	2,000.00	do.	70.00	Do.
do.	do.	4,000.00	2,000.00	do.	185.00	Do.
do.	do.	4,400.00	2,300.00	do.	72.00	Do.
do.	do.	4,675.00	2,800.00	do.	58.00	Do.
do.	do.	4,725.00	3,100.00	do.	378.00	Do.
do.	do.	4,725.00	3,100.00	do.	58.00	Do.
do.	do.	4,250.00	3,100.00	do.		Do.
do.	do.	4,250.00	3,100.00	do.	42.00	Do.

TABLE III.—Statement of floating plant owned by the United States and
NEW ORLEANS, LA. (FOURTH MISSISSIPPI RIVER DISTRICT)—Continued.

Name or number.	Type.	Dis- place- ment.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
		Long tons.	Ft. in.	Ft. in.	Ft. in.		Where.
Barge No. 48.....	Decked barge.....	98.00	124 0	30 0	7 7	1909	New Orleans, La.
Barge No. 49.....	do.....	98.00	124 0	30 0	7 7	1909	Do.
Barge No. 51.....	do.....	98.00	124 0	30 0	7 7	1909	Do.
Barge No. 52.....	do.....	98.00	124 0	30 0	7 7	1909	Do.
Barge No. 53.....	do.....	98.00	124 0	30 0	7 7	1909	Do.
Barge No. 54.....	do.....	98.00	124 0	30 0	7 7	1910	Do.
Barge No. 55.....	do.....	98.00	124 0	30 0	7 7	1911	Do.
Barge No. 56.....	do.....	98.00	124 0	30 0	7 7	1911	Do.
Barge No. 57.....	do.....	98.00	124 0	30 0	7 7	1912	Do.
Barge No. 58.....	do.....	98.00	124 0	30 0	7 7	1912	Do.
Barge No. 59.....	do.....	98.00	124 0	30 0	7 7	1912	Do.
Barge No. 60.....	do.....	98.00	124 0	30 0	7 7	1912	Do.
Barge No. 61.....	do.....	98.00	124 0	30 0	7 7	1913	Do.
Barge No. 62.....	do.....	98.00	124 0	30 0	7 7	1913	Do.
Barge No. 63.....	do.....	98.00	124 0	30 0	7 7	1913	Do.
Barge No. 64.....	do.....	98.00	124 0	30 0	7 7	1913	Do.
Barge No. 65.....	do.....	98.00	124 0	30 0	7 7	1913	Do.
Barge No. 66.....	do.....	99.00	124 0	30 0	7 7	1913	Do.
Barge No. 67.....	do.....	98.00	124 0	30 0	7 7	1915	Jeffersonville, Ind.
Barge No. 68.....	do.....	98.00	124 0	30 0	7 7	1916	New Orleans, La.
Barge No. 69.....	do.....	98.00	124 0	30 0	7 7	1916	Do.
Barge No. 70.....	do.....	98.00	124 0	30 0	7 7	1916	Do.
Barge No. 71.....	do.....	98.00	124 0	30 0	7 7	1916	Do.

NEWPORT, R. I.

Monomoy.....	Gasoline launch, screw.....	62.00	82 9	15 6	9 6	1914	Muskegon, Mich.
Gedney.....	Seagoing hopper dredge.....	1,500.00	157 0	36 6	16 0	1887	Wilmington, Del.
Navesink.....	do.....	3,150.00	280 0	47 6	28 0	1906	Sparrows Point, Md.
Gazelle.....	Gasoline launch, screw.....	73.00	66 5	18 2	10 7	1896	Noank, Conn.
U. S. Engineers.....	do.....	6.30	30 0	6 5	3 2	1893	Morris Heights, N.Y.

NEW YORK, FIRST DISTRICT.

De Witt Clinton.....	Hydraulic pipe-line dredge.....	383.00	95 0	27 6	8 6	1913	Baltimore, Md.....
Gen. G. L. Gillespie..	do.....	880.00	150 0	37 0	11 10	1913	Albany, N. Y.....
No. 17, Hudson River	Concrete mixing plant.....	270.00	90 0	27 0	7 0	1913	do.....
No. 6, Hudson River	Gravel digging and screening plant.....	150.00	85 0	28 0	8 10	1912	do.....
No. 16, Hudson River	Derrick boat.....	170.00	80 0	26 6	6 0	1913	do.....
No. 19, Hudson River	do.....	204.00	79 6	27 0	8 8	1913	do.....
No. 20, Hudson River	do.....	145.00	81 0	27 6	8 6	1913	Albany, N. Y.....
No. 3, Hudson River	Quarter boat.....	17.00	40 5	15 6	2 4	1911	New Baltimore, N.Y.
No. 1, Hudson River	do.....	30.00	42 0	20 5	3 2	1911	do.....
No. 41, Hudson River	do.....	150.00	88 9	26 4	8 9	1914	Albany, N. Y.....
No. 44, Hudson River	do.....	80.00	62 0	22 0	4 3	1914	do.....
No. 31, Hudson River	Tugboat (steam).....	35.00	53 0	16 2	6 11	1911	do.....
No. 45, Hudson River	do.....	34.00	61 0	16 10	6 10	1911	do.....
No. 33, Hudson River	Survey boat.....	8.00	39 6	9 6	6 6	1911	do.....
No. 34, Hudson River	Inspection boat.....	4.00	32 0	5 6	2 6	1911	do.....
No. 2, Hudson River	Survey scow.....	10.00	50 0	15 0	2 10	1911	New Baltimore, N.Y.
No. 12, Hudson River	do.....	14.00	50 0	15 0	2 10	1913	Albany, N. Y.....
No. 4, Hudson River	Boring scow ¹	32.00	50 0	21 9	3 1	1912	do.....
No. 25, Hudson River	Drill boat ²	37.00	34 4	15 6	4 0	1916	do.....
No. 39, Hudson River	do.....	130.00	80 0	26 0	3 8	1915	do.....
No. 5, Hudson River	50-ton barge ²	32.00	50 0	21 7	3 2	1912	do.....

¹ Sold.² Dredge Talcott exchanged for dredge Gillespie February, 1916. Value allowed for Talcott in the exchange, \$60,150.

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

NEW ORLEANS, LA. (FOURTH MISSISSIPPI RIVER DISTRICT)—Continued.

When.	Purchased.		First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
	Where.	Material.					
		Wood.	\$4,250.00	\$3,100.00	Good..	\$86.00	Improving Mississippi River, fourth district.
		do.	5,000.00	3,500.00	do.	482.00	Do.
		do.	5,000.00	3,600.00	do.	70.00	Do.
		do.	5,000.00	3,600.00	do.	.....	Do.
		do.	5,000.00	3,600.00	do.	86.00	Do.
		do.	5,000.00	3,600.00	do.	84.00	Do.
		do.	4,000.00	3,200.00	do.	38.00	Do.
		do.	4,000.00	3,200.00	do.	32.00	Do.
		do.	4,000.00	3,200.00	do.	23.00	Do.
		do.	4,307.00	3,700.00	do.	34.00	Do.
		do.	4,307.00	3,700.00	do.	137.00	Do.
		do.	4,307.00	3,700.00	do.	18.00	Do.
		do.	4,100.00	3,700.00	do.	4.00	Do.
		do.	4,100.00	3,700.00	do.	8.00	Do.
		do.	4,100.00	3,700.00	do.	9.00	Do.
		do.	4,100.00	3,700.00	do.	14.00	Do.
		do.	4,100.00	3,700.00	do.	409.00	Do.
		do.	4,100.00	3,700.00	do.	90.00	Do.
		Steel.	8,250.00	8,000.00	do.	6.00	Do.
		Wood.	4,725.00	4,725.00	do.	.....	Do.
		do.	4,725.00	4,725.00	do.	.....	Do.
		do.	4,725.00	4,725.00	do.	.....	Do.
		do.	4,725.00	4,725.00	do.	.....	Do.

NEWPORT, R. I.

1892	New York, N. Y.	Wood.	\$29,159.55	\$25,000.00	Good..	\$169.37	Rivers and harbors, south-east coast of Massachusetts, and Rhode Island.
		Steel.	72,500.00	15,000.00	Poor..	82.60	
1910	Block Island, R. I.	Wood.	384,129.28	280,000.00	Good..	5,019.40	
1893	Morris Heights, N. Y.	do.	3,800.00	3,500.00	do.	3,024.32	
		do.	2,090.00	300.00	Poor..	52.06	

NEW YORK, FIRST DISTRICT.

		Wood.	\$62,826.00	\$52,449.00	Good..	\$12,931.25	Hudson River, N. Y.
1916	Baltimore, Md.	Steel.	157,909.00	164,908.00	do.	23,119.95	
		Wood.	11,313.94	1,007.00	do.	90.00	
		do.	8,013.75	1,550.00	do.	178.00	
		do.	11,460.10	7,058.79	do.	.....
1913	New York, N. Y.	do.	3,800.00	1,006.00	Fair..	.....
		do.	6,222.70	820.00	Good..	.....
		do.	455.00	429.00	do.	18.00	
1906	Albany, N. Y.	do.	3,000.00	98.00	Poor..	.....
		do.	6,712.83	3,846.00	Good..	181.00	
		do.	2,841.75	315.00	Very good.	.....
1913	New York, N. Y.	do.	5,400.00	7,046.00	Fair..	1,928.15	Hudson River, N. Y.
1914	Albany, N. Y.	do.	7,000.00	6,430.00	Good..	2,887.81	
1913	North Tona-wanda, N. Y.	do.	3,696.00	3,080.00	do.	46.24	
1913	do.	do.	1,822.50	997.00	do.	627.44	
		do.	535.00	157.00	do.	.....
		do.	993.61	95.00	do.	.....
		do.	2,562.07	124.00	do.	758.33	
		do.	1412.50	580.00	do.	657.63	
		do.	12,000.00	8,138.00	do.	147.20	
		do.	3,973.00	1,205.00	do.	.....

* Formerly pile driver.

* Small drill boat constructed on scow No. 25 using equipment on hand.

TABLE III.—Statement of floating plant owned by the United States Army.

NEW YORK, FIRST DISTRICT—Continued.

Name or number.	Type.	Displacement.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
		<i>Long tons.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>		
No. 7, Hudson River.	150-ton barge ¹	235 00	85 0	28 0	8 10	1912	Albany, N. Y.
No. 9, Hudson River.	350-ton barge.....	80 00	85 0	28 0	8 10		
No. 10, Hudson River.	450-ton barge.....	90 00	92 0	28 6	9 6		
No. 11, Hudson River.	400-ton barge.....	85 00	88 6	23 6	8 6		
No. 13, Hudson River.	150-ton barge.....	200 00	71 0	24 0	7 0	1879	Brooklyn, N. Y.
No. 15, Hudson River.	10-ton barge.....	4 00	20 0	12 0	2 0		
No. 22, Hudson River.	250-ton barge.....	90 00	85 6	26 6	8 6		
No. 23, Hudson River.	50-ton barge.....	18 00	35 0	15 6	5 0		
No. 26, Hudson River.	200-ton barge.....	72 00	80 0	25 0	7 0		
No. 27, Hudson River.	do.....	72 00	80 0	25 0	7 0		
No. 28, Hudson River.	do.....	72 00	80 0	25 0	7 0		
No. 29, Hudson River.	do.....	72 00	80 0	25 0	7 0		
No. 30, Hudson River.	250-ton barge.....	86 00	90 0	27 0	7 0		
No. 37, Hudson River.	do.....	80 00	84 8	26 0	7 0		
No. 38, Hudson River.	do.....	80 00	84 8	26 0	7 0		
No. 40, Hudson River.	200-ton barge.....	70 00	78 0	25 6	8 0		
No. 42, Hudson River.	400-ton barge.....	120 00	98 6	25 11	7 0		
Nos. 1 to 20, Hudson River.	Rowboats.....	(²)	(²)	(²)	(²)		Albany, N. Y.
Nos. 21 and 22, Hudson River.	do.....	(²)	(²)	(²)	(²)		
Nos. 1 to 4, Hudson River (in 15 sections).	Sweep floats.....	(²)	(²)	(²)	(²)		Albany, N. Y.
Capt. Geo. H. Derby.	Gasoline launch (screw).	15 10	44 0	10 0	6 0	1915	Wilmington, N. C.
Sweep.....	Sweep boat and survey boat.	85 00	56 3	26 2	6 0	1908	New London, Conn.
"W".....	Gasoline launch (screw).	16 4	4 8	4 8	0 10	1911	Amesbury, Mass.
Wah-ta-wah.....	do.....	52 00	80 0	15 1	6 3	1911	Greenport, N. Y.
6.....	Rowboat.....	15 0	4 0	4 0	1 6	1908	New York, N. Y.
7.....	do.....	15 0	4 0	4 0	1 6	1909	do.....
8.....	do.....	16 0	4 0	4 0	1 6	1914	New York, N. Y.
9.....	do.....	16 0	4 0	4 0	1 6	1914	do.....
10.....	do.....	16 0	4 0	4 0	1 6	1914	do.....
11.....	do.....	19 0	4 0	4 0	1 6	1914	Unknown.
12.....	do.....	16 0	4 0	4 0	1 6	1916	Corona, L. I.
13.....	do.....	16 0	4 0	4 0	1 6	1916	do.....
Nos. 1 to 6.....	Sweep floats.....	25 0	9 0	2 0	2 0	1914	Albany, N. Y.
7.....	do.....	25 0	9 0	2 0	2 0	1914	Unknown.
8.....	do.....	25 0	9 0	2 0	2 0	1914	do.....
Nos. 9 to 11.....	do.....	25 0	9 0	2 0	2 0	1912	New York, N. Y.

NEW YORK, SECOND DISTRICT.

*Atlantic.....	Seagoing hopper dredge.	2,670.00	288 0	47 6	25 0	1904	Sparrows Point, Md.
*Engineer, N. Y.	Tug and survey boat, screw (steam).	197.00	100 3	21 2	10 8	1911	Camden, N. J.
Ingalls, Gen.....	Gasoline launch (screw).	8.00	43 0	8 4	4 9	1896	Jersey City, N. J.
Manisces.....	Tug and survey boat, screw (steam).	225.00	106 0	22 0	9 0	1898	Noank, Conn.

NOTE.—Boats marked * are not on our property report. The Atlantic and Navesink belong to the Navy.

¹ Formerly concrete mixer.

² Various.

and in the Engineer Department at large on Dec. 31, 1916—Continued.

NEW YORK, FIRST DISTRICT—Continued.

Purchased.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Where.						
.....	Wood.	\$8,278.36	.....	Poor..	\$272.67	
New York, N. Y.	do.	1,470.00	\$659.00	Fair..		
do.	do.	850.00	486.00	do.		
do.	do.	1,470.00	633.00	do.		
do.	do.	Unknown.	Nothing.	No good.		
Albany, N. Y.	do.	110.00	Nothing.	Poor..		
New York, N. Y.	do.	850.00	200.00	do.		
do.	do.	412.50	17.50	Very poor.		
do.	do.	1,815.00	1,322.00	Fair..	237.87	
do.	do.	1,500.00	811.00	do.	101.36	
do.	do.	1,500.00	919.00	do.	195.71	Hudson River, N. Y.
do.	do.	1,815.00	1,070.00	do.		
do.	do.	1,500.00	652.00	do.		
do.	do.	850.00	177.00	do.		
do.	do.	850.00	160.00	do.		
do.	do.	1,500.00	1,241.00	do.	490.52	
do.	do.	1,700.00	1,200.00	do.		
do.	do.	Various.	Various.	do.	Various.	
Baltimore, Md. ^a	do.	Various.	Various.	do.	Various.	
do.	do.	Various.	Various.	do.	Various.	
do.	do.	4,561.00	4,305.00	Excellent.	37.10	River and harbor works.
do.	do.	8,058.00	5,781.31	Good..	506.71	Do.
New York, N. Y.	do.	216.50	108.23	Poor..	4.80	Do.
do.	do.	15,463.00	15,327.39	Very good.	1,618.74	Do.
New York, N. Y.	do.	100.00	64.11	Poor..		Do.
do.	do.	100.00	64.11	do.		Do.
do.	do.	131.56	102.57	Good..		Do.
do.	do.	134.18	102.57	do.		Do.
do.	do.	126.08	95.96	Fair..		Do.
New Hamburg, N. Y.	do.	62.00	58.90	Good..		Do.
do.	do.	110.00	105.60	Excellent.		Do.
do.	do.	110.00	105.60	do.		Do.
do.	do.		Various.	Fair..		Do.
New York, N. Y.	do.			do.		Do.
do.	do.			do.		Do.
do.	do.			Poor..		Do.

NEW YORK, SECOND DISTRICT.

.....	Steel..	\$361,500.00	\$200,000.00	Good..	\$909.42	New York Harbor, N. Y., Ambrose channel. Leased to the New London district since Sept. 25, 1916.
do.	do.	47,800.00	.....	do.		Sold to Panama Canal Commission (March, 1916).
New Jersey City, N. J.	Wood.	4,500.00	3,500.00	do.	253.17	New York Harbor, N. Y., Bay Ridge, and Red Hook Channels, drift.
Peacedale, R. I.	do.	18,500.00	14,500.00	do.	2,019.14	New York Harbor, N. Y., surveys, drift.

^a Acquired as part of equipment of U. S. dredge Gen. Gillespie.

TABLE III.—Statement of floating plant owned by the United States Army.

NEW YORK, SECOND DISTRICT—Continued.

Name or number.	Type.	Dimensions.				When.	Built.
		Dis- place- ment.	Length.	Beam.	Depth.		
		<i>Long tons.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>		
*Navesink.....	Seagoing hopper dredge.	3,150.00	290 0	47 6	28 0	1908	Sparrows Point
Raritan.....	do.....	2,930.00	290 0	47 6	28 0	1908	do.....
Schuyler.....	Gasoline launch (screw).	1.00	25 0	5 8	1 10	1902	Plattsburg
Drift.....	do.....	.50	18 0	5 0	1 0	1916	Brooklyn,

NEW YORK, N. Y. (SUPERVISOR OF NEW YORK HARBOR.)

Nimrod.....	Steam tug.....	245.00	106 11	21 7	10 8	1890	Noank, Conn.
Lamont.....	do.....	216.00	108 0	21 9	12 6	1895	Camden, N. J.
Lookout.....	Naphtha launch.....	3.00	30 8	6 6	3 9	1896	New York
Scout.....	Steam tug.....	195.00	106 1	20 0	10 8	1896	Camden, N. J.
Vigilant.....	do.....	208.00	114 5	21 8	12 0	1900	Elizabeth, N. J.
Cerberus.....	do.....	226.00	109 3	21 10	12 6	1905	Camden, N. J.

NOTE.—Beam is given without the guards.

NORFOLK, VA.

Currituck.....	Hydraulic pipe-line dredge.	805.00	150 0	37 0	11 10	1914	Baltimore, Md.
Hampton ¹	do.....	91.00	60 0	23 0	6 0	1902	Richmond, Va.
No name ²	Dipper dredge.....	159.00	65 0	26 2	6 5	.....	Not known
Roanoke.....	Snag boat and bucket dredge.	232.00	115 0	24 0	5 10	1895	Petersburg, Va.
No name ⁴	Derriek boat.....	43.00	42 11	15 11	3 9	.....	Not known
Chipeta.....	Tow and survey boat, steam (screw).	45.00	76 8	14 10	8 4	1893	Jamestown, Va.
Long Point.....	Gasoline launch, screw..	5.00	38 0	9 6	4 0	1912	Crittenden, Va.
Millville.....	do.....	1.00	22 6	6 6	2 6	1913	Roanoke Island, Va.
Munden.....	do.....	1.00	22 6	6 6	2 6	1913	do.....
Norva.....	do.....	6.50	36 10	10 6	4 3	1912	Norfolk, Va.
Okisko.....	do.....	15.00	41 0	11 6	6 0	1914	Camden, N. J.
Paquippe.....	do.....	65.00	82 9	15 6	9 6	1914	Muskegon, Mich.
Powhatan.....	do.....	6.40	40 2	10 2	4 3	1910	St. Joseph, Mo.
Skycoak.....	do.....	41.00	60 0	15 1	7 0	1914	Camden, N. J.
Starvation.....	do.....	1.00	22 6	6 6	2 6	1913	Roanoke Island, Va.
Coinjock.....	Quarter boat.....	72.70	80 0	22 0	4 3	1913	Norfolk, Va.
Pungo.....	do.....	72.70	80 0	22 0	4 3	1913	do.....

¹ Formerly carried as Floating Pump No. 1. Not operated in 1916.² Acquired with purchase of Albemarle and Chesapeake Canal. Not in commission.⁴ Not known.

ed in the Engineer Department at large on Dec. 31, 1916—Continued.

NEW YORK, SECOND DISTRICT—Continued.

Purchased.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Where.						
.....	Steel..	\$384,129.28	.....	Good..	.....	New York Harbor, N. Y., Ambrose Channel. Loaned to Newport district entire year.
.....	...do..	397,600.00	275,000.00	...do..	\$12,269.62	New York Harbor, N. Y., Ambrose Channel.
New York, N. Y.	Wood..	1,110.80	500.00	...do..	.....	New York Harbor, N. Y., Forts Schuyler, Slocum, and Totten.
New York, N. Y.	...do..	599.00	600.00	...do..	.....	New York Harbor, N. Y., surveys and drift.

NEW YORK, N. Y. (SUPERVISOR OF NEW YORK HARBOR.)

New York.....	Wood..	\$37,000.00	\$5,000.00	Poor..	\$424.95	Prevention of deposits, Harbor of New York.
.....	Steel..	37,500.00	16,000.00	...do..	1,615.04	Do.
.....	Wood..	1,450.00	100.00	Very poor.	94.00	Do.
.....	Steel..	35,550.00	11,000.00	Poor..	1,333.61	Do.
.....	...do..	44,700.00	20,000.00	Good..	2,390.27	Do.
.....	...do..	43,740.00	25,000.00	...do..	978.80	Do.

NORFOLK, VA.

.....	Steel..	\$164,180.00	\$150,000.00	Good..	\$12,116.46	Inland waterway, Norfolk, Va., to Beaufort Inlet, N. C.
Richmond, Va..	Wood..	4,800.00	2,000.00	Poor..	.....	Fortifications, Fortress Monroe, Va.
Not known.....	...do..	(²)	150.00	Bad..	.....	Inland waterway, Norfolk, Va., to Beaufort Inlet, N. C.
.....	...do..	15,321.02	2,000.00	Poor..	64.45	Improving Roanoke River, N. C.
.....	...do..	(²)	500.00	...do..	181.32	Inland waterway, Norfolk, Va., to Beaufort Inlet, N. C.
Boston, Mass.....	...do..	(²)	2,500.00	Fair...	43.91	Improving James River, Va.
Hampton, Va.....	...do..	(²)	500.00	...do..	189.23	Inland waterway, Norfolk, Va., to Beaufort Inlet, N. C.
.....	.....	350.00	200.00	...do..	90.24	Do.
.....	.....	350.00	200.00	...do..	51.02	Do.
Norfolk, Va.....	.....	\$ 2,138.75	1,200.00	Good..	31.30	Improving harbor at Norfolk, Va.
Hamden, N. J.....	...do..	4,395.00	3,500.00	...do..	428.90	Inland waterway, Norfolk, Va., to Beaufort Inlet, N. C.
.....	...do..	27,581.67	24,000.00	...do..	1,095.22	Improving harbor at Norfolk, Va.
St. Joseph, Mich. ....	...do..	2,890.00	800.00	Poor..	.....	Improving James River, Va.
.....	...do..	13,487.50	12,000.00	Good..	940.97	Inland waterway, Norfolk, Va., to Beaufort Inlet, N. C.
.....	.....	350.00	200.00	Fair...	121.95	Do.
.....	.....	5,865.98	3,500.00	Good..	266.86	Do.
.....	...do..	5,865.98	3,500.00	...do..	266.86	Do.

red with purchase of Albemarle and Chesapeake Canal.

es amount of \$165 allowed for launches "Rainbow" and "1904," which were delivered in part

TABLE III.—Statement of floating plant owned by the United States Army.

NORFOLK, VA.—Continued.

Name or number.	Type.	Displacement.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
		<i>Long tons.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>		
No. 1.....	Quarter boat.....	64.00	80 2	19 1	4 2	1892	Petersburg
No. 1.....	Water barge.....	7.40	29 0	10 0	4 0	1913	Norfolk, V.
No. 3.....	Deck scow.....	57.00	72 6	26 6	6 9	1911	West Point
No. 4.....	do.....	57.00	72 6	26 6	6 9	1911	do.....
No. 10.....	Deck scow.....	98.00	91 0	27 8	8 0	1914	Norfolk, V.
No. 11.....	do.....	98.00	91 0	27 8	8 0	1914	do.....
No. 12.....	Flatboat ferry.....	8.00	40 0	12 0	2 6	1914	Great Bridge
No. 13.....	do.....	8.00	40 0	12 0	2 6	1914	do.....
No. 1.....	Rowboat.....		21 9	6 0	2 3	1888	Baltimore
No. 13.....	do.....		14 8	4 5	1 11		Not known
No. 14.....	do.....		14 8	4 5	1 11		do.....
No. 16.....	do.....		18 8	5 5	1 7	1910	Richmond
No. 17.....	do.....		19 8	5 4	1 6	1910	do.....
No. 18.....	do.....		19 10	5 5	1 7	1910	do.....
No. 19.....	do.....		17 11	4 10	1 4	1910	do.....

PHILADELPHIA, PA.

Delaware.....	Seagoing hopper dredge.....	4,200.00	315 0	52 0	22 6	1905	Sparrows
Manhattan.....	do.....	4,000.00	288 0	47 6	25 0	1904	do.....
Catawba.....	Hydraulic pipe-line dredge.....	886.00	140 6	40 4	10 7	1905	Baltimore
Uncle Sam ²	do.....	450.00	85 0	34 0	7 0	1899	Jersey City
Rattler.....	Derrick boat.....	240.00	85 0	32 0	7 3	1908	Camden, N.
Vidette.....	Tugboat.....	200.00	105 0	21 0	10 0	1898	Baltimore
Camden.....	do.....	170.00	80 0	20 0	9 0	1906	Philadelphia
Philadelphia.....	do.....	55.00	67 0	16 0	7 6	1894	Wilmington
Mifflin.....	Gasoline launch.....	49.00	79 10	15 0	8 10	1916	Camden, N.
Schuylkill.....	do.....	16.00	54 0	12 0	5 3	1901	Philadelphia
Tranton.....	do.....	4.50	28 0	8 0	3 8	1912	Hollyoak
Delaware.....	do.....	2.00	20 2	6 8	3 2	1908	Camden, N.
New Castle.....	do.....	1.50	24 6	7 0	2 8	1912	Pennsgrove
Chester.....	Quarter boat.....	90.00	60 0	25 0	5 8	1912	Philadelphia
Observer.....	do.....	25.00	50 0	20 0	4 0	1896	Camden, N.
No. 3.....	Deck scow.....	330.00	78 0	26 0	9 0	1889	Brooklyn
No. 4 ³	do.....	100.00	65 0	20 0	7 3	1879	New York
No. 5.....	Derrick scow.....	50.00	38 0	18 0	6 0	1875	Brooklyn
No. 6.....	Coal and water scow.....	60.00	50 0	20 0	6 0	1910	Camden, N.
No. 7.....	Deck scow.....	75.00	60 0	20 0	6 0	1913	Philadelphia

NOTE.—Displacements are "light."

PITTSBURGH, PA.

No. 1 ⁴	Dipper dredge (nonpropelling).....	308.00	83 0	32 0	7 0	1903	Jeffersonville
No. 2 ⁴	do.....	197.00	94 0	30 0	4 8	1905	Parkersburg
Swan ⁴	Stern-wheel snag and repair boat.....	264.00	150 0	31 4	4 6	1908	Pittsburgh

¹ Not known.² Transferred to the U. S. Engineer Office, Wilmington, Del., on Dec. 22, 1916.³ Rebuilt in 1914.⁴ Condemned.

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

NORFOLK, VA.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
1862	Petersburg, Va.	Wood.	\$2,476.17	\$10.00	Bad...		Improving James River, Va.
1915	Norfolk, Va.	do.	200.00	100.00	Fair...		Inland waterway, Norfolk, Va., to Beaufort Inlet, N.C.
		do.	2,000.00	1,000.00	do.		Improving James River, Va.
		do.	2,000.00	1,000.00	do.		Do.
		do.	4,474.62	3,800.00	Good...		Inland waterway, Norfolk, Va., to Beaufort Inlet, N.C.
		do.	4,474.62	3,800.00	do.		Do.
		do.	400.00	300.00	do.		Do.
		do.	400.00	300.00	do.		Do.
1888	Baltimore, Md.	Iron...	132.00	20.00	Fair...		Improving James River, Va.
1906	Boston, Mass.	Wood.	()	10.00	do.		Do.
1906	do.	do.	()	10.00	do.		Do.
		do.	60.50	25.00	do.		Do.
		do.	61.75	25.00	do.		Do.
		do.	64.25	25.00	do.		Do.
		do.	58.00	20.00	do.		Do.

PHILADELPHIA, PA.

		Steel.	\$392,134.00	\$200,000.00	Good..	\$13,197.94	Delaware River, Pa. and N. J.
		do.	341,577.24	160,000.00	do.	18,807.08	Do.
1906	Baltimore, Md.	Wood.	80,600.00	57,000.00	do.	4,143.72	Do.
1904	Jersey City, N. J.	do.	18,855.94	8,500.00	Poor..		Do.
		do.	7,187.28	12,000.00	Good..	1,762.24	Do.
		Steel.	35,100.00	24,000.00	do.	1,230.84	Do.
1912	New York, N. Y.	do.	30,000.00	21,000.00	do.	551.08	Do.
		do.	15,997.61	7,870.00	do.	1,231.00	Do.
		Wood.	19,350.00	19,250.00	do.	747.14	Do.
		do.	6,000.00	500.00	Poor..		Do.
		do.	992.00	600.00	Good..	5.70	Do.
		do.	450.00	75.00	Poor..	32.10	Do.
1912	New Castle, Del.	do.	499.00	250.00	Good..	10.00	Do.
		do.	3,932.00	2,500.00	do.	38.50	Do.
		do.	1,161.00	100.00	Poor..		Do.
		do.	4,000.00	400.00	do.	62.25	Do.
		do.	2,000.00		()		Do.
		do.	3,000.00	500.00	Poor..	96.14	Do.
		do.	2,245.00	1,000.00	Good..		Do.
		do.	3,285.00	2,000.00	do.		Do.

PITTSBURGH, PA.

		Wood.	\$17,565.00	\$9,450.00	Fair...	\$1,494.57	Monongahela River, W. Va., Locks 3, 6, etc.
1907	Pittsburgh, Pa.	do.	17,000.00	10,800.00	do.	611.48	Operation and care of canals, etc., Monongahela and Ohio Rivers. ⁷
		Steel..	\$1,800.00	25,000.00	Good..	13,329.75	Monongahela River, W. Va., Locks 3, 6, etc.

⁵ Hull and house rebuilt 1911 by United States.

⁶ Second hand.

⁷ Title of work to which belonging: "Operating and care of canals and other works of navigation—Indefinite."

⁸ Formerly Gen. Theodore Schwan.

TABLE III.—Statement of floating plant owned by the United States Army.

PITTSBURGH, PA.—Continued.

Name or number.	Type.	Displacement.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
		Long tons.	Ft. in.	Ft. in.	Ft. in.		Where.
Mary Ann ¹	{Crane boat (nonpropelling).	161.00	115 0	27 0	3 8	1892	Monongahela
Monongahela.....		227.00	120 0	28 0	3 6	1914	United States yard, Lock Monongahela
It.....	{Derrick boat (nonpropelling).	47.00	50 0	22 0	4 2	1890	Monongahela
No. 1, M. R.....		86.00	70 0	26 0	3 8	1916	United States yard, Lock Monongahela
No. 2, M. R.....	do.	70.00	70 6	26 6	4 0	1902	do.
No. 3, M. R.....	do.	90.00	70 7	26 7	4 0	1905	do.
No. 4, M. R.....	do.	101.00	70 0	32 0	3 8	1916	do.
No. 5, M. R.....	do.	101.00	70 0	32 0	3 8	1915	do.
No. 1, O. R.....	do.	87.00	71 0	30 7	4 0	1910	do.
No. 1, M. R.....	{Pile-driver boat (nonpropelling).	68.00	50 0	26 6	4 0	1904	do.
No. 2, M. R.....		66.00	50 0	26 4	4 7	1906	do.
No. 1, A. R. ²	Maneuver boat (nonpropelling).	41.00	56 0	18 0	3 0	1902	Pittsburgh,
No. 1, O. R. ³	do.	70.00	60 0	22 0	4 0	1906	United States yard, Lock Monongahela
No. 2, O. R.....	do.	76.00	60 0	22 0	3 8		
No. 3, O. R. ⁴	do.	54.00	60 0	20 0	4 0	1906	Glenosborne
No. 4, O. R. ⁴	do.	58.00	60 0	22 0	3 8	1906	Legionville,
No. 5, O. R. ⁴	do.	65.00	60 0	22 0	3 8	1906	Merrill, Pa.
No. 6, O. R. ⁵	do.	41.00	56 0	18 0	3 0	1904	United States yard, Lock Monongahela
No. 7, O. R.....	do.	76.00	60 0	22 0	3 8		
No. 8, O. R.....	do.	65.00	60 0	22 0	3 8		
No. 9, O. R.....	do.	76.00	60 0	22 0	3 8		
No. 10, O. R.....	do.	87.00	60 0	22 0	3 8		
Kittanning ⁶	Stern-wheel survey and inspection boat.	135.00	118 0	20 0	3 6	1915	Albany, Ind.
T. P. Roberts.....	Stern-wheel towboat.	206.00	133 2	22 10	5 0	1906	Marietta, Oh.
Slackwater ⁷	Stern-wheel repair boat.	242.00	137 8	26 10	4 4	1902	do.
Albatross ⁸	Gasoline launch (screw).	1.70	30 6	7 0	2 10	1887	New York, N. Y.
Luzon.....	do.	12.00	53 0	9 4	4 9	1901	do.
No. 1, M. R.....	Scraper (derrick) boat (nonpropelling).	64.00	50 2	28 4	4 6	1910	United States yard, Lock Monongahela
Deluge.....	Steam pump boat (nonpropelling).	170.80	80 0	21 0	4 2	1898	Elizabeth, P.
No. 1, O. R.....	do.		80 0	22 0	4 2	1910	United States yard, Lock Monongahela
No. 1.....	Dump scow, 4 pockets, 90 cubic yards (nonpropelling).		70 2	20 10	6 9	1902	Cincinnati, O.
No. 2.....	do.		70 2	20 10	6 9	1902	do.

¹ Estimated cost.² New hull, March, 1915.³ Formerly No. 2, O. R.⁴ New hull, May, 1916.

in the Engineer Department at large on Dec. 31, 1916—Continued.

PITTSBURGH, PA.—Continued.

Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Pittsburgh, Pa.	Wood.	\$11,000.00 (estimated.)	\$40.00	Bad...	\$34.95	Operation and care of canals, etc., Monongahela River.
.....	do.	21,502.00	19,350.00	Good..	100.95	Do.
.....	do.	2,800.00	200.00	Bad...	50.01	Do.
.....	do.	6,423.00	6,423.00	Good..	41.91	Do.
.....	do.	3,300.00	2,000.00	Fair...	97.34	Do.
.....	do.	3,500.00	1,100.00	do.	598.45	Do.
.....	do.	7,561.00	7,561.00	Good..	.....	Do.
.....	do.	8,184.00	7,775.00	do.	93.31	Do.
.....	do.	6,785.00	4,500.00	do.	.....	Operation and care of canals, etc., Ohio River.
.....	do.	3,500.00	1,000.00	Bad...	423.23	Monongahela River, Pa., Lock No. 2.
.....	do.	3,750.00	500.00	do.	.....	Operation and care of canals, etc., Monongahela River.
.....	do.	4,000.00	3,600.00	Good..	285.00	Dam at Herrs Island, Allegheny River, near Pittsburgh, Pa.
.....	do.	5,600.00	2,200.00	Fair...	.....	Ohio River, below Pittsburgh, Pa., Dam No. 2.
Pittsburgh, Pa.	Steel..	8,820.00	8,050.00	Good..	60.00	Operation and care of canals, etc., Ohio River.
.....	Wood.	6,000.00	5,200.00	do.	2,903.74	Ohio River, below Pittsburgh, Pa., Dam No. 3.
.....	do.	6,000.00	5,200.00	do.	2,785.00	Ohio River, below Pittsburgh, Pa., Dam No. 4.
.....	do.	4,250.00	4,000.00	do.	3,272.00	Ohio River, below Pittsburgh, Pa., Dam No. 5.
.....	do.	4,600.00	4,300.00	do.	635.00	Ohio River, below Pittsburgh, Pa., Dam No. 6.
Pittsburgh, Pa.	Steel..	8,820.00	8,000.00	do.	13.57	Ohio River, below Pittsburgh, Pa., Dam No. 7.
do.	Wood.	5,101.00	2,800.00	do.	285.00	Ohio River, below Pittsburgh, Pa., Dam No. 8.
do.	Steel..	8,820.00	8,000.00	do.	5.00	Ohio River, below Pittsburgh, Pa., Dam No. 9.
do.	do.	6,702.00	6,702.00	do.	.....	Ohio River, below Pittsburgh, Pa., Dam No. 10.
.....	do.	29,530.00	26,580.00	do.	98.04	Operation and care of canals, etc., Monongahela, Ohio, and Allegheny Rivers.
.....	Wood.	17,370.00	10,000.00	do.	1,265.70	Monongahela River, W. Va., and operation and care of canals, etc., Monongahela River.
.....	do.	13,500.00	12,150.00	do.	261.01	Operation and care of canals, etc., Monongahela River.
Cincinnati.	do.	740.00	200.00	Fair...	25.65	Do.
New York, N. Y.	do.	4,680.00	570.00	do.	94.90	Harbor at Pittsburgh, Pa.
do.	do.	3,675.00	2,500.00	Good..	.....	Operation and care of canals, etc., Monongahela River.
Pittsburgh, Pa.	do.	6,000.00	1,000.00	Fair...	862.88	Do.
.....	do.	5,850.00	4,000.00	Good..	490.39	Operation and care of canals, etc., Ohio River.
Pittsburgh, Pa.	do.	3,800.00	800.00	Bad...	240.11	Monongahela River, W. Va., Locks 3, 6, etc.
do.	do.	3,800.00	800.00	do.	.....	Do.

* New hull, May, 1914.
 * Cabin built by United States, Lock 4, Pa.

† Formerly No. 116011.
 * New hull, 1913.

TABLE III.—Statement of floating plant owned by the United

PITTSBURGH, PA.—Continued.

Name or number.	Type.	Displacement.	Dimensions.			When.	Buil W
			Length.	Beam.	Depth.		
No. 5.....	Dump scow, 4 pockets, 90 cubic yards (non-pelling).	Long tons.	70 2	20 10	6 9	1907	United S yard, I
No. 6.....	do.		70 2	20 10	6 9	1907	do.
No. 1, M. R.....	Quarter boat (nonpropelling).	44.00	85 0	22 0	3 6	1902	do.
No. 1 ¹	Flat.	155.00	90 0	16 0	6 0		
No. 2.....	do.		46 6	11 0	1 10		
No. 3.....	do.		46 6	11 0	1 8		
No. 5.....	do.		40 0	14 0	2 6	1916	United S yard, I
No. 6.....	do.	156.00	90 6	16 0	6 0		
No. 7.....	do.	156.00	90 6	16 0	6 0		
No. 8.....	do.	175.00	90 0	18 0	6 0	1902	United S yard, I
No. 9.....	do.	175.00	90 0	18 0	6 0	1902	do.
No. 10.....	do.	175.00	90 0	18 0	6 0	1902	do.
No. 11.....	do.	175.00	90 0	18 0	6 0	1902	do.
No. 12.....	do.	217.00	100 0	20 0	6 0	1905	do.
No. 13 ²	do.	260.00	100 0	24 0	6 0	1905	do.
No. 14.....	do.		41 0	14 0	2 6	1916	do.
No. 15.....	do.	217.00	100 0	20 0	6 0	1905	do.
No. 16.....	do.	217.00	100 0	20 0	6 0	1905	do.
No. 17 ²	do.	260.00	100 0	24 0	6 0	1905	do.
No. 18.....	do.		48 0	11 0	2 1	1901	do.
No. 19.....	do.		48 0	12 0	2 2	1915	do.
No. 20.....	do.	175.00	90 0	18 0	6 0	1908	do.
No. 21.....	do.		38 0	11 0	2 1		
No. 22.....	do.		38 0	11 0	2 0	1904	United S yard, I
No. 23.....	do.		38 0	11 0	2 0	1904	do.
No. 24.....	do.		38 0	11 0	2 0	1904	do.
No. 25.....	do.		38 0	11 0	2 0	1904	do.
No. 26.....	do.		38 0	11 0	2 0	1904	do.
No. 27.....	do.		38 0	11 0	2 0	1904	do.
No. 28.....	do.		24 0	9 0	1 7	1908	do.
No. 29.....	do.		42 8	12 0	2 4	1908	do.
No. 30.....	do.		38 0	11 0	2 0	1909	do.
No. 31.....	do.		48 0	11 0	2 0	1909	do.
No. 32.....	do.		48 0	11 0	2 0	1909	do.
No. 33.....	do.		36 0	12 0	2 0	1909	do.
No. 34.....	do.		48 0	12 0	2 0	1910	do.
No. 35.....	do.		42 0	10 0	2 0	1911	do.
No. 36.....	do.	217.00	100 0	20 0	6 0	1912	do.
No. 37 ²	do.	217.00	100 0	20 0	6 0	1912	do.
No. 39.....	do.	260.00	100 0	24 0	6 0	1916	do.
No. 40.....	do.	200.00	100 0	24 0	6 0	1916	do.
No. 41.....	do.	200.00	100 0	24 0	6 0	1916	do.
No. 42.....	do.	200.00	100 0	24 0	6 0	1916	do.
No. 44.....	do.		30 0	10 0	2 0	1916	do.
No. 45.....	do.		30 0	10 0	2 0	1916	do.
No. 46.....	do.		30 0	10 0	2 0	1916	do.
No. 47.....	do.		30 0	10 0	2 0	1916	do.
No. 48.....	do.		30 0	10 0	2 0	1916	do.
No. 49.....	do.		30 0	10 0	2 0	1916	do.
No. 101.....	do.		35 0	12 0	1 10	1910	do.
No. 102.....	do.		48 0	12 0	2 7	1902	Merrill, I
No. 103.....	do.		40 0	12 0	2 6	1914	United S yard, I
No. 104.....	do.		40 0	12 0	2 6	1914	do.
No. 105.....	do.		48 0	11 0	2 0	1905	do.
No. 106.....	do.		40 0	12 0	2 0	1915	do.
No. 107.....	do.	217.00	100 6	20 0	6 0	1905	do.

¹ Second hand; rebuilt by United States, 1908.² Temporarily equipped with concrete mixer outfit.

oyed in the Engineer Department at large on Dec. 31, 1916—Continued.

PITTSBURGH, PA.—Continued.

Purchased.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Where.						
	Wood.	\$3,500.00	\$800.00	Bad...	\$632.93	Operation and care of canals, etc., Monongahela River.
	do...	3,500.00	800.00	do...	543.84	Do.
	do...	3,150.00	800.00	Fair...	159.71	Do.
Pittsburgh, Pa.	do...	400.00	350.00	do...		Do.
do	do...	190.00	5.00	Bad...		Do.
do	do...	190.00		do...		Do.
do	do...	393.00	393.00	Good...		Do.
Roscoe, Pa.	do...	750.00	500.00	do...		Do.
do	do...	750.00	400.00	Fair...	20.00	Do.
do	do...	1,300.00	100.00	Bad...		Do.
	do...	1,300.00	100.00	do...	12.00	Do.
	do...	1,300.00	50.00	do...	25.00	Do.
	do...	1,300.00	500.00	Fair...	346.51	Do.
	do...	1,600.00	400.00	Bad...		Do.
	do...	1,700.00	400.00	Fair...	712.00	Do.
	do...	344.00	344.00	Good...	5.00	Do.
	do...	1,600.00	400.00	Fair...		Do.
	do...	1,600.00	375.00	do...	5.00	Do.
	do...	1,700.00	500.00	Good...	420.32	Do.
	do...	225.00	5.00	Bad...		Do.
	do...	301.00	250.00	Fair...	33.90	Do.
	do...	1,300.00	500.00	Good...	63.57	Do.
Pittsburgh, Pa.	do...	200.00	25.00	Fair...	(*)	Do.
	do...	175.00	20.00	do...		Do.
	do...	175.00	5.00	Bad...		Do.
	do...	175.00	20.00	do...		Do.
	do...	175.00	20.00	do...		Do.
	do...	175.00	15.00	do...		Do.
	do...	175.00	10.00	do...		Do.
	do...	120.00	30.00	Fair...		Do.
	do...	210.00	140.00	do...		Do.
	do...	187.00	85.00	do...		Do.
	do...	204.00	100.00	do...		Do.
	do...	196.00	60.00	do...	58.87	Do.
	do...	184.00	60.00	do...	63.10	Do.
	do...	213.00	70.00	Good...		Do.
	do...	222.00	75.00	Fair...	28.16	Do.
	do...	2,015.00	1,000.00	do...		Do.
	do...	2,015.00	1,000.00	do...		Do.
	do...	2,854.00	2,854.00	Good...		Do.
	do...	2,854.00	2,854.00	do...		Do.
	do...	2,854.00	2,854.00	do...		Do.
	do...	2,854.00	2,854.00	do...		Do.
	do...	211.00	211.00	do...		Do.
	do...	211.00	211.00	do...		Do.
	do...	211.00	211.00	do...		Do.
	do...	211.00	211.00	do...		Do.
	do...	211.00	211.00	do...		Do.
	do...	211.00	211.00	do...		Do.
	do...	160.00	3.00	Bad...		Operation and care of canals, etc., Ohio River.
	do...	150.00	50.00	Fair...	16.00	Ohio River below Pittsburgh, Pa., Dam No. 5.
	do...	262.00	240.00	Good...		Operation and care of canals, etc., Ohio River.
	do...	262.00	240.00	do...		Do.
	do...	204.00	15.00	Bad...		Ohio River below Pittsburgh, Pa., Dam No. 5.
	do...	307.00	282.00	Good...	20.00	Ohio River below Pittsburgh, Pa., Dam No. 10.
	do...	1,600.00	400.00	Fair...		Ohio River below Pittsburgh, Pa., Dam No. 3.

* Shortened 9 feet.

* Temporarily equipped as a pump boat.

TABLE III.—Statement of floating plant owned by the United States Army.

PITTSBURGH, PA.—Continued.

Name or number.	Type.	Displacement.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
No. 108.....	Flat.....	Long tons.	Ft. in.	Ft. in.	Ft. in.	1916	United States yard, Lock
No. 109.....	do.....		35 0	12 0	2 0	1911	do.....
No. 110.....	do.....		40 0	12 0	2 6	1911	do.....
No. 111.....	do.....		45 0	12 0	2 6	1916	do.....
No. 114.....	do.....		43 0	12 0	2 0	1908	do.....
No. 115.....	do.....		48 0	11 0	2 6	1908	do.....
No. 201.....	do.....		36 0	14 0	2 0	1911	do.....
No. 202.....	do.....		28 0	10 0	2 6	1916	do.....
No. 203.....	do.....		41 0	12 0	2 6	1907	do.....
No. 204.....	do.....		40 0	12 0	2 6	1907	do.....
No. 205.....	do.....		28 0	10 0	2 6	1916	United States yard, Lock

PORTLAND, ME.

Norka.....	Gasoline launch, screw ..	22.00	62 0	14 0	6 1	1906	New York, N
------------	---------------------------	-------	------	------	-----	------	-------------

PORTLAND, OREG., FIRST DISTRICT.

Michie, Col. P. S.....	Seagoing hopper dredge.....	1,528.00	242 0	43 0	20 0	1913	Seattle, Wash.
Oregon.....	Hydraulic pipe-line dredge.....	645.00	120 0	36 0	11 0	1908	Portland, Ore.
Celilo.....	do.....	64.00	76 0	22 0	4 4	1916	Big Eddy, Ore.
Cascade.....	Bucket dredge.....	90.00	70 0	30 0	4 0	1900	Cascade Lock
Umatilla.....	Self-propelling derrick boat.....	300.00	159 9	34 4	5 1	1908	Celilo, Ore.
Asotin ¹	do.....	200.00	140 0	28 0	5 0	1912	do.....
Coyote.....	Gasoline launch.....	2.00	28 0	5 0	3 0	1911	Portland, Ore.
Jennie.....	do.....	5.00	30 0	8 0	3 3	1907	do.....
Murrelet.....	do.....	2.50	24 0	6 5	2 6	1912	Astoria, Ore.
Nehalem.....	do.....	4.00	30 0	8 9	3 0		
Ocia.....	do.....	2.00	30 0	5 0	3 0	1906	Portland, Ore.
Palouse.....	do.....	2.00	27 9	4 8	2 9	1907	do.....
No. 1.....	Derrick boat.....	51.00	65 0	28 5	3 10	1890	Coos Bay, Ore.
No. 2.....	do.....	84.00	70 0	30 0	4 0	1910	North Bend, Ore.
No. 1.....	200-ton dredge scow.....	60.00	62 0	28 0	5 6	1890	Coquille River
No. 2.....	84-ton dredge scow.....	84.00	70 0	30 0	3 8	1900	Tillamook, Ore.
No. 8.....	Stone barge.....	130.00	89 1	27 1	0 5	1889	Yaquina, Ore.
No. 9.....	do.....	130.00	89 1	27 1	0 5	1889	do.....
No. 10.....	do.....	130.00	89 1	27 1	0 5	1889	do.....
No. 1.....	Wood scow.....	50.00	60 0	24 0	4 0	1900	Portland, Ore.
No. 2.....	do.....	18.00	38 0	12 0	3 0	1905	Tillamook, Ore.
No. 1.....	Flat boat.....	10.00	30 0	10 0	2 9	1903	do.....

¹ Formerly named Wallowa.

ed in the Engineer Department at large on Dec. 31, 1916—Continued.

PITTSBURGH, PA.—Continued.

Purchased.						
Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
.....	Wood.	\$300.00	\$300.00	Good..	.....	Operation and care of canals, etc., Ohio River.
.....	do..	160.00	80.00	Fair...	\$2.00	Ohio River below Pittsburgh, Pa., Dam No. 8.
.....	do..	224.00	80.00	do..	.....	Operation and care of canals, etc., Ohio River.
.....	do..	385.00	385.00	Good..	.....	Do.
.....	do..	245.00	75.00	Fair...	.....	Do.
.....	do..	245.00	95.00	do..	.....	Do.
.....	do..	197.00	95.00	Good..	.....	Operation and care of canals, etc., Allegheny River.
.....	do..	200.00	200.00	do..	.....	Do.
Coraopolis, Pa.	do..	215.00	10.00	Bad...	.....	Do.
do.	do..	215.00	10.00	do..	.....	Do.
do.	do..	196.00	196.00	Good..	.....	Do.

PORTLAND, ME.

New York, N. Y.	Wood.	\$12,500.00	\$5,000.00	Good..	\$588.64	River and harbor improvements.
-----------------	-------	-------------	------------	--------	----------	--------------------------------

PORTLAND, OREG., FIRST DISTRICT.

Seattle, Wash...	Steel..	\$378,193.63	\$350,000.00	Excellent.	\$17,790.67	Coos Bay, Oreg.
Portland, Oreg..	Wood.	98,502.58	28,000.00	Fair...	8,201.71	Various harbors, Oregon and Washington.
.....	do..	5,000.00	5,000.00	Excellent.	.....	Dalles-Celilo Canal.
.....	do..	6,056.00	5,900.00	do..	39.28	Cascade Locks, Oreg.; new hull, 1915.
Celilo, Oreg.....	do..	55,215.00	27,500.00	Fair...	77.17	Upper Columbia River Celilo to Snake.
.....	do..	30,815.00	24,500.00	Excellent.	173.90	Snake River, Oreg., Wash., and Idaho.
Portland, Oreg..	do..	1,450.00	950.00	Good..	40.29	Upper Columbia and Snake Rivers.
do.	do..	1,550.00	700.00	do..	.....	Tillamook Bay and Bar.
Astoria, Oreg.....	do..	890.00	700.00	Excellent.	11.00	Coos Bay, dredge Michie.
.....	do..	900.00	900.00	do..	.....	Nehalem Bay, Oreg.
Nehalem, Oreg..	do..	1,500.00	900.00	Fair...	561.50	Upper Columbia and Snake Rivers; new hull in 1916.
.....	do..	2,150.00	1,000.00	Excellent.	18.49	Upper Columbia and Snake Rivers; new hull in 1914.
.....	do..	3,785.00	300.00	Poor.	.....	Coos River; new hull in 1903.
North Bend, Oreg.	do..	5,574.37	2,700.00	Good..	154.92	Coquille River, Oreg.
.....	do..	3,000.00	25.00	Unserviceable.	.....	Do.
Tillamook, Oreg.	do..	2,700.00	250.00	Poor..	123.68	Tillamook Bay and Bar, Oreg.
.....	do..	2,341.00	75.00	do..	.....	Siuslaw River, Oreg.
.....	do..	2,341.00	75.00	do..	.....	Do.
.....	do..	2,341.00	75.00	do..	.....	Do.
Portland, Oreg..	do..	750.00	100.00	do..	54.50	Tillamook Bay and Bar, Oreg.
Tillamook, Oreg.	do..	250.00	50.00	do..	.....	Do.
do.	do..	250.00	50.00	do..	.....	Do.

TABLE III.—Statement of floating plant owned by the United States Army.
PORTLAND, OREG., FIRST DISTRICT—Continued.

Name or number.	Type.	Displacement.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
		<i>Long tons.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>		
"A".....	Coal barge.....	250.00	90 0	30 0	7 0	1909	Kennewick,
No. 1.....	Drill boat.....	80.00	65 0	20 0	3 8	1907	Riparian, Wa
No. 2.....	do.....	80.00	65 0	20 0	3 8	1907	do.....
No. 3.....	do.....	80.00	65 0	20 0	3 8	1907	do.....
No. 11.....	Stone barge.....	270.00	90 0	32 0	7 0	1915	Portland, Or
No. 12.....	do.....	270.00	90 0	32 0	7 0	1915	do.....
No. 13.....	Fuel barge.....	90.00	61 0	24 0	5 0	1915	do.....
No. 14.....	Water barge.....	45.00	50 0	20 0	3 6	1915	do.....

PORTLAND, OREG., SECOND DISTRICT.

Chinook ¹	Seagoing hopper dredge.....	7,400.00	400 0	49 0	34 0	1892	Belfast, Ire
Clatsop.....	do.....	1,360.00	180 0	38 0	23 0	1908	Newport Ne
Multnomah.....	Hydraulic pipe-line dredge.....	1,135.00	209 4	39 0	9 6	1913	Portland, Or
Wahkiakum.....	do.....	1,135.00	209 4	39 0	9 6	1913	do.....
Monticello.....	Combined hydraulic pipe-line and bucket dredge.....	195.00	103 3	34 6	5 10	1915	(²).....
Champoeg.....	Dipper dredge.....	165.00	80 0	30 0	5 0	1904	Portland, Or
Mathloma.....	Snag boat.....	177.00	100 0	34 6	5 6	1896	do.....
No. 1.....	Derrick boat (barge).....	42.00	51 0	22 0	2 10	1913	do.....
No. 2.....	do.....	42.00	51 0	22 0	2 10	1913	do.....
No. 3.....	do.....	42.00	51 0	22 6	2 10	1913	do.....
No. 4.....	do.....	42.00	51 0	22 6	2 10	1913	do.....
No. 5.....	do.....	112.00	90 0	30 0	6 4	1915	do.....
No. 1.....	Pile driver.....	36.00	60 0	22 0	3 6	1906	do.....
No. 2.....	do.....	82.00	70 0	24 0	4 0	1912	do.....
Adams, H. M.....	Tug boat, screw (steam).....	95.00	78 4	18 9	7 6	1913	Astoria, Ore
Arago.....	do.....	90.00	89 6	18 0	9 0	1904	Portland, Or
Mendell, O. H.....	do.....	150.00	101 0	21 2	10 0	(³)	do.....
Post, J. C.....	do.....	95.00	78 4	18 9	7 6	1913	Astoria, Ore
Woodland.....	Tow boat, paddle(steam).....	75.00	97 0	24 0	4 6	1915	Portland, Or
Dolly.....	Gasoline launch, screw.....	2.50	25 2	5 10	2 0	1899	Morris Heigh
Eureka.....	do.....	3.00	25 0	8 6	3 4	1906	Wilmington,
Mohawk.....	do.....	5.50	35 0	8 6	3 9	1910	Portland, Or
Papoose.....	do.....	6.00	30 3	8 0	4 0	1899	Morris Heigh

¹ Formerly U. S. transport Grant.² Remodeled at San Francisco, Cal., 1903; remodeled at Portland, Oreg., 1910, and again in 1915.³ Hull and house St. Helens, Oreg.; machinery, Portland, Oreg.⁴ Unserviceable.⁵ Hull rebuilt at Portland, Oreg., 1906, and again in 1915.

ed in the Engineer Department at large on Dec. 31, 1916—Continued.

PORTLAND, OREG., FIRST DISTRICT—Continued.

Purchased.						
Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Kennewick, Wash.	Wood.	\$1,500.00	\$800.00	Fair...	\$75.00	Upper Columbia and Snake Rivers.
Riparia, Wash.	do.	4,682.00	1,500.00	do.		Do.
do.	do.	4,682.00	1,500.00	do.	11.40	Do.
do.	do.	4,682.00	1,500.00	do.	447.84	Do.
Portland, Oreg.	do.	3,872.00	3,450.00	Excellent.		Coquille River, Oreg.
do.	do.	3,872.00	3,450.00	do.		Do.
do.	do.	1,850.00	1,750.00	do.	46.20	Tillamook Bay, Oreg., for dredge Oregon.
do.	do.	990.00	950.00	do.		Do.

PORTLAND, OREG., SECOND DISTRICT.

do.	Steel.	Unknown.	\$390,000.00	Good.	\$34,789.29	Improving mouth of Columbia River, Oreg. and Wash.
do.	do.	\$304,385.00	175,000.00	do.	8,298.76	Improving Columbia and Lower Willamette Rivers below Portland, Oreg.
do.	do.	174,236.50	160,000.00	do.	6,985.69	Do.
do.	do.	174,226.50	160,000.00	do.	7,431.31	Do.
do.	Wood.	27,830.00	27,000.00	do.	444.43	Improving Cowlitz, Lewis, and Clatskanie Rivers, Wash. and Oreg.
do.	do.	19,200.00	4,000.00	(*)		Improving Willamette and Yamhill Rivers, Oreg.
do.	do.	19,580.00	12,000.00	Good.	1,087.81	Do.
do.	do.	2,706.00	2,050.00	do.		Improving Columbia and Lower Willamette Rivers below Portland, Oreg.
do.	do.	2,706.00	2,050.00	do.		Do.
do.	do.	2,706.00	2,050.00	do.		Do.
do.	do.	8,400.00	7,600.00	do.	151.78	Improving Willamette River, Oreg., for Willamette Falls.
do.	do.	1,355.00	150.00	(*)		Improving Willamette and Yamhill Rivers, Oreg.
do.	do.	8,750.00	5,850.00	Good.	41.77	Improving Columbia and Lower Willamette Rivers below Portland, Oreg.
do.	do.	16,465.83	14,000.00	do.	870.19	Do.
do.	do.	\$24,490.00	5,000.00	Poor.	849.69	Improving mouth of Columbia River, Oreg. and Wash., and improving Columbia and Lower Willamette Rivers below Portland, Oreg.
do.	do.	34,750.00	23,300.00	Good.	3,577.06	Do.
do.	do.	16,465.83	14,000.00	do.	1,003.66	Improving Columbia and Lower Willamette Rivers below Portland, Oreg.
do.	do.	16,978.00	16,000.00	do.		Improving Cowlitz, Lewis, and Clatskanie Rivers, Wash. and Oreg.
New York, N. Y.	do.	1,273.25	100.00	(*)	46.43	Improving Columbia and Lower Willamette Rivers below Portland, Oreg.
do.	do.	Unknown.	150.00	do.	72.95	Do.
do.	do.	1,800.00	500.00	Poor.		Improving mouth of Columbia River, Oreg. and Wash.
do.	do.	Unknown.	1,000.00	Fair.	85.53	Do.

* Includes outfit.

† Engines built in 1889; boiler in 1904; hull and house in 1912.

‡ Very poor.

§ Formerly steam launch, screw.

TABLE III.—Statement of floating plant owned by the United States Army, Second District—Continued.

Name or number.	Type.	Displacement.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
		Long tons.	Ft. in.	Ft. in.	Ft. in.		
Salem.....	Gasoline launch, screw..	6.50	35 0	9 0	3 0	1910	Portland, O.
Vigilant.....	do.....	22.00	63 3	12 0	7 6	1908	Eagle Harbor, O.
No. 1.....	Quarter boat.....	120.00	90 0	26 0	4 0	1902	Portland, O.
No. 2.....	do.....	25.00	56 0	20 0	3 0	1915	do.....
No. 1.....	Concrete mixer (bargo)..	146.00	90 0	30 0	6 4	1915	do.....
No. 1.....	400-ton fuel barge, scow..	118.00	124 0	32 6	5 10	1913	do.....
No. 2.....	do.....	118.00	124 0	32 6	5 10	1913	do.....
No. 3.....	do.....	118.00	124 0	32 6	5 10	1913	do.....
No. 4.....	do.....	118.00	124 0	32 6	5 10	1913	do.....
No. 5.....	do.....	118.00	124 0	32 6	5 10	1913	do.....
No. 6.....	do.....	118.00	124 0	32 6	5 10	1913	do.....
No. 7.....	do.....	118.00	124 0	32 6	5 10	1915	do.....
No. 8.....	do.....	118.00	124 0	32 6	5 10	1915	do.....
No. 9.....	85-ton fuel barge, scow..	40.00	68 6	24 6	4 0	1910	do.....
A.....	800-ton model barge.....	350.00	120 0	32 0	8 0	1902	do.....
B.....	do.....	350.00	120 0	32 0	8 0	1902	do.....
No. 2.....	10-ton scow barge.....	7.00	32 0	14 0	2 6	1908	do.....
No. 3.....	30-ton scow barge.....	20.00	48 0	18 0	3 6	1915	do.....
No. 4.....	do.....	20.00	48 0	18 0	3 6	1915	do.....
No. 5.....	do.....	20.00	48 0	18 0	3 6	1915	do.....
No. 6.....	do.....	20.00	48 0	18 0	3 6	1915	do.....
No. 7.....	200-ton scow barge.....	100.00	90 0	30 0	6 4	1915	do.....
Nos. 1 to 100.....	Pipe-line pontoons.....	5.50	26 8	12 4	2 5	1913	do.....
Nos. 101 to 100.....	do.....	5.50	26 8	12 4	2 5	1913	do.....
Nos. 101 to 180.....	do.....	1.00	10 0	6 0	2 0	1915	do.....
Nos. 6 to 17.....	Row boats.....	(¹)	(¹)	(¹)	(¹)	(¹)	Various...

ROCK ISLAND, ILL.

Apo.....	Hydraulic pipe-line dredge.	294.00	132 0	28 5	5 0	1912	Keokuk, Ia.
Etna.....	do.....	266.00	130 0	28 0	5 0	1909	.....do.....
Geyser.....	do.....	141.00	100 0	24 0	4 5	1912	Milan, Ill.
Hecia.....	do.....	217.00	120 0	26 0	5 0	1901	Fountain C.
Mayon.....	do.....	309.00	130 6	26 0	5 5	1912	Ke-kuk, Ia.
Polce.....	do.....	250.00	119 0	30 0	5 0	1909	Stillwater,
Taal.....	do.....	299.00	130 0	28 0	5 0	1912	Keokuk, Ia.
Vesuvius.....	do.....	244.00	120 0	30 0	5 0	1909	Fountain C.
236.....	Suction pontoon.....	56 0	15 6	2 6	1909	Stillwater,	
201.....	do.....	56 0	16 0	3 0	1909	Fountain C.	
318.....	do.....	64 0	16 0	2 6	1909	Keokuk, Ia.	
352.....	do.....	64 0	16 0	3 6	1910	.....do.....	
357.....	do.....	64 0	16 0	3 6	1910	.....do.....	
354.....	do.....	61 0	16 0	3 0	1910	.....do.....	
Ajax.....	Dipper dredge.....	115.00	70 0	26 0	6 0	1876	Quincy, Ill.
Apache.....	do.....	240.00	80 0	30 0	8 0	1895	Lyons, Iowa
Davenport.....	do.....	348.00	110 0	40 0	6 0	1914	Rock Island
Keokuk.....	do.....	348.00	110 0	40 0	6 0	1914	.....do.....

¹ Hull rebuilt at Portland, Oreg., 1915.

² Very poor.

³ Each.

ed in the Engineer Department at large on Dec. 31, 1916—Continued.

PORTLAND, OREG., SECOND DISTRICT—Continued.

Purchased.						
Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
	Wood.	\$2,200.00	\$800.00	Fair...	\$204.31	Improving Willamette and Yamhill Rivers, Oreg.
	do.	6,900.00	3,600.00	do.	221.18	Improving Columbia and Lower Willamette Rivers below Portland, Oreg.
	do.	3,050.00	2,800.00	Good...		Do.
	do.	727.86	600.00	do.		Do.
	do.	8,000.00	7,200.00	do.	88.36	Improving Willamette River, Oreg., for Willamette Falls.
	do.	3,960.00	2,800.00	do.	394.17	Improving Columbia and Lower Willamette Rivers below Portland, Oreg.
	do.	3,960.00	2,800.00	do.		Do.
	do.	3,960.00	2,800.00	do.		Do.
	do.	3,960.00	2,800.00	do.		Do.
	do.	3,960.00	2,800.00	do.		Do.
	do.	3,960.00	2,800.00	do.		Do.
	do.	4,487.59	3,800.00	do.		Do.
	do.	4,487.59	3,800.00	do.		Do.
	do.	2,128.00	2,128.00	do.		Do.
	do.	6,950.00	1,800.00	Fair...	792.39	Improving mouth of Columbia River, Oreg. and Wash.
	do.	6,950.00	1,800.00	do.	44.76	Improving Columbia and Lower Willamette Rivers below Portland, Oreg.
	do.	259.00	15.00	(*)		Do.
	do.	477.67	383.00	Good...		Do.
	do.	477.67	383.00	do.		Do.
	do.	477.67	383.00	do.		Do.
	do.	477.67	383.00	do.		Do.
	do.	3,600.00	3,000.00	do.		Improving Willamette River, Oreg., for Willamette Falls.
	do.	\$177.50	\$140.00	do.		Improving Columbia and Lower Willamette Rivers below Portland, Oreg.
	do.	\$170.00	\$140.00	do.		Do.
	do.	\$50.00	\$40.00	do.		Improving Cowlitz, Lewis, and Clatskanie Rivers, Wash. and Oreg.
Various	Various	Various	Various	Various		Various.

ROCK ISLAND, ILL.

	(*)	\$28,703.00	\$16,360.73	Good..	\$1,918.00	Mississippi River, Missouri River to Minneapolis.
	(*)	25,328.00	15,845.86	do.	2,262.02	Do.
	(*)	19,552.09	16,284.33	do.	778.87	Do.
	Wood.	27,084.00	7,334.27	do.	176.65	Do.
	(*)	29,154.00	24,849.34	do.	8,662.12	Do.
	Wood.	31,954.00	15,113.02	do.	3,073.10	Do.
	(*)	28,476.97	16,383.81	do.	1,441.94	Do.
	Wood.	29,729.78	10,242.95	do.	474.04	Do.
	do.	982.00	577.17	do.	340.62	Do.
	do.	757.00	301.14	do.	75.29	Do.
	do.	747.00	554.74	do.	249.10	Do.
	do.	781.00	491.94	do.	106.21	Do.
	do.	784.00	556.62	do.	285.00	Do.
	do.	702.00	302.71	do.	75.68	Do.
Keokuk, Iowa.	do.	11,300.00	2,561.33	Fair..	107.00	Des Moines Rapids Canal.
	do.	15,255.00	5,064.17	Bad..		Mississippi River, Missouri River to Minneapolis.
	Steel..	85,663.00	31,713.78	Good..	2,313.33	Do.
	do.	85,454.00	31,291.86	do.	1,963.52	Do.

* Various.

* Wood, steel, and concrete.

* Wood and steel.

TABLE III.—Statement of floating plant owned by the United States and
ROCK ISLAND, ILL.—Continued.

Name or number.	Type.	Dis- place- ment.	Dimensions.				When.	Built.	Where.
			Length.	Beam.	Depth.				
		<i>Long tons.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>				
Phoenix.....	Dipper dredge.....	240.00	80 0	30 0	8 0	1909			Milan, Ill.....
St. Paul.....	do.....	348.00	110 0	40 0	6 0	1914			Rock Island, Ill.....
David Tipton ¹	Snag boat.....	235.00	165 0	34 0	5 0	1900			Jeffersonville, Ind.....
Ada.....	Towboat.....	30.00	76 0	11 0	3 0	1889			Keokuk, Iowa.....
Alert.....	do.....	135.00	130 0	19 6	3 10	1874			Stillwater, Minn.....
Coal Bluff.....	do.....	175.00	148 0	35 0	4 0	1878			Ohio River.....
Elmor.....	do.....	213.00	140 0	25 0	4 0	1906			Jeffersville, Ind.....
Ellen.....	do.....	200.00	144 0	26 0	4 5	1907			La Crosse, Wis.....
Elsie.....	do.....	30.00	75 0	13 0	3 0	1889			Jeffersville, Ind.....
Emily.....	do.....	30.00	78 0	12 0	3 0	1889			Keokuk, Iowa.....
Fury.....	do.....	120.00	128 6	22 0	2 10	1881			Dubuque, Iowa.....
Grace.....	do.....	33.00	92 6	17 0	2 2	1904			Keokuk, Iowa.....
Le Claire.....	do.....	285.00	125 4	31 0	4 6	1915			Grafton, Ill.....
Louise.....	do.....	30.00	79 0	12 0	3 0	1881			Keokuk, Iowa.....
Lucia.....	do.....	35.00	76 0	12 8	3 0	1884			do.....
Mac.....	do.....	35.00	85 0	10 0	3 3	1891			Rock Island, Ill.....
Marion.....	do.....	50.00	93 0	18 0	3 0	1895			Keokuk, Iowa.....
Minneapolis.....	do.....	285.00	125 4	31 0	4 0	1915			Grafton, Ill.....
Muscatine.....	do.....	285.00	125 4	31 0	4 0	1915			do.....
Nauvoo.....	do.....	284.00	125 4	31 0	4 0	1915			do.....
Ruth.....	do.....	35.00	80 0	18 9	3 0	1895			Keokuk, Iowa.....
Chippewa.....	Launch (gasoline, screw).....	35 0	6 0	2 6	1913				St. Paul, Minn.....
Galena.....	do.....	35 0	6 0	2 6	1913				do.....
Hawatha.....	do.....	35 0	6 0	2 6	1913				do.....
J. C. Long.....	do.....	12.00	45 0	8 5	3 5	1900			La Crosse, Wis.....
Leona.....	Launch (gasoline, pad- dle).....	10.00	40 0	12 0	3 0	1907			Blossomburg, Ill.....
Minnesota.....	Launch (gasoline, screw).....	35 0	6 0	2 6	1913				St. Paul, Minn.....
Minnehaha.....	do.....	35 0	6 0	2 6	1913				do.....
Myra.....	do.....	10.00	40 0	7 4	3 0	1902			La Crosse, Wis.....
Quincy.....	do.....	35 0	6 0	2 6	1912				St. Paul, Minn.....
Scorpion.....	do.....	28 0	4 6	3 4	1911				Keokuk, Iowa.....
Trimbelle.....	do.....	35 0	6 0	2 6	1913				St. Paul, Minn.....
Vamos.....	do.....	5.00	31 0	7 0	2 0	1903			Red Wing, Minn.....
Viper.....	do.....	28 0	4 6	2 6	1909				Keokuk, Iowa.....
Waumandee.....	do.....	30 0	5 8	2 6	1910				Tonka Bay, Minn.....
Zumbro.....	do.....	35 0	6 0	2 6	1913				St. Paul, Minn.....
Alberita.....	Motor skiff.....	26 0	5 3	1 3	1910				Keokuk, Iowa.....
Bass.....	do.....	26 0	5 3	1 3	1910				do.....
Cobra.....	do.....	26 0	5 3	1 3	1909				do.....
Comet.....	do.....	26 0	5 3	1 3	1911				do.....
Dahlia.....	do.....	26 0	5 3	1 3	1912				do.....
Daisy.....	do.....	26 0	5 3	1 3	1912				do.....
Dakota.....	do.....	28 0	5 2	1 3	1913				St. Paul, Minn.....
Davy.....	do.....	26 0	4 0	1 3	1909				Fountain City, Wis.....
Dolly ²	do.....	26 0	5 3	1 3	1909				Keokuk, Iowa.....
Folly.....	do.....	26 0	5 3	1 3	1909				do.....
Fox ²	do.....	26 0	5 3	1 3	1909				do.....
Fuchsia ²	do.....	26 0	5 3	1 3	1910				Keokuk, Iowa.....
Gar.....	do.....	28 0	5 2	1 3	1913				St. Paul, Minn.....
Grey Cloud.....	do.....	28 0	5 6	1 10	1915				Milan, Ill.....
Hamilton.....	do.....	28 0	5 3	1 3	1908				Keokuk, Iowa.....
Holly.....	do.....	26 0	5 3	1 3	1909				do.....
Hornet.....	do.....	26 0	5 3	1 3	1909				do.....
Jolly.....	do.....	26 0	5 3	1 3	1907				do.....
Lark.....	do.....	26 0	5 3	1 3	1907				do.....

¹ Formerly Col. A. Mackenzie.² Condemned 1916.

ed in the Engineer Department at large on Dec. 31, 1916—Continued.

ROCK ISLAND, ILL.—Continued.

Purchased.					Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Where.	Material.	First cost.	Estimated value.	Condition.		
Metropolis, Ill.	Wood.	\$19,525.00	\$5,129.63	Bad.		Mississippi River, Missouri River to Minneapolis.
Jeffersonville, Ind.	Steel.	56,130.00	31,049.38	Good.	\$2,126.16	Do.
	do.	32,000.00	8,988.51	Fair.	1,052.48	Snag boats and dredge boats on upper Mississippi River and tributaries.
	do.	4,000.00	2,240.61	Good.	376.57	Mississippi River, Missouri River to Minneapolis.
Stillwater, Minn.	do.	6,000.00	5,847.46	do.	557.14	Do.
Ohio River.	do.	8,000.00	10,633.42	do.	2,612.84	Do.
Jeffersonville, Ind.	do.	17,589.00	5,265.47	Fair.	264.01	Do.
La Crosse, Wis.	do.	12,000.00	7,759.14	Good.	1,301.40	Do.
Jeffersonville, Ind.	Steel.	5,113.00	1,665.00	Fair.	629.28	Do.
	Wood.	4,024.00	1,761.35	Good.	31.87	Do.
Dubuque, Iowa.	do.	11,976.00	6,717.40	do.	1,667.61	Do.
	do.	8,228.00	2,864.10	do.	986.15	Do.
	Steel.	44,238.00	36,572.98	do.	1,400.24	Do.
	do.	3,538.00	1,540.38	do.	197.99	Do.
	Wood.	4,070.00	2,368.26	do.	666.15	Do.
Rock Island, Ill.	do.	3,153.00	3,470.01	Fair.	649.22	Do.
	do.	6,500.00	3,735.22	do.	376.52	Illinois and Mississippi Canal.
	Steel.	44,675.00	36,475.76	Good.	568.64	Mississippi River, Missouri River to Minneapolis.
	do.	43,789.00	35,117.57	do.	108.20	Do.
	do.	42,868.00	35,353.70	do.	1,326.87	Do.
	Wood.	6,426.00	5,426.47	do.	163.59	Do.
St. Paul, Minn.	do.	1,724.00	893.63	do.	99.57	Do.
	do.	1,724.00	1,107.22	do.	196.93	Do.
	do.	1,557.00	669.31	do.	49.42	Do.
Rock Island, Ill.	do.	1,700.00	1,433.09	Fair.	118.01	Illinois and Mississippi Canal.
Coal Valley, Ill.	do.	1,000.00	1,125.54	do.	347.24	Do.
St. Paul, Minn.	do.	1,724.00	1,134.32	Good.	163.01	Mississippi River, Missouri River to Minneapolis.
do.	do.	1,557.00	703.86	do.	83.30	Do.
La Crosse, Wis.	do.	1,500.00	482.68	Fair.	66.88	Do.
St. Paul, Minn.	do.	1,557.00	836.50	Good.	129.42	Do.
	do.	812.00	802.11	do.	119.85	Do.
St. Paul, Minn.	do.	1,724.00	795.46	do.	61.58	Do.
Red Wing, Minn.	do.	1,975.00	416.77	Poor.		Do.
	do.	800.00	528.70	Good.	86.02	Illinois and Mississippi Canal.
St. Louis, Mo.	do.	950.00	612.83	Fair.	52.75	Do.
St. Paul, Minn.	do.	1,724.00	928.18	Good.	125.55	Mississippi River, Missouri River to Minneapolis.
	do.	214.00	183.12	do.	42.20	Do.
	do.	310.00	250.22	do.	88.03	Do.
	do.	365.00	182.21	Fair.		Do.
	do.	300.00	289.27	Poor.	71.85	Do.
	do.	291.00	242.85	Fair.	70.31	Do.
	do.	284.00	287.00	do.	52.03	Do.
St. Paul, Minn.	do.	589.00	496.10	do.	112.45	Do.
	do.	285.00	75.78	Poor.		Do.
	Wood.	245.00	449.49	Good.	118.55	Do.
	do.					Do.
	do.					Do.
	Wood.	261.00	279.04	Fair.	46.97	Do.
St. Paul, Minn.	do.	589.00	493.51	Good.	150.07	Do.
	do.	581.51	381.48	do.	9.17	Do.
	do.	245.00	156.57	Poor.		Do.
	do.	499.00	237.72	Fair.	24.35	Do.
	do.	241.00	164.37	do.	20.48	Do.
	do.	262.00	156.39	do.	15.71	Do.

* Condemned 1916; sunk and lost in deep water on Rock Island Rapids.

TABLE III.—Statement of floating plant owned by the United States Army.

ROCK ISLAND, ILL.—Continued.

Name or number.	Type.	Displacement.	Dimensions.			Built.	Where.
			Length.	Beam.	Depth.		
		Long tons.	Ft. in.	Ft. in.	Ft. in.	When.	
Molly.....	Motor skiff.....		26 0	5 3	1 3	1909	Keokuk, Iowa
Otter.....	do.....		26 0	5 3	1 3	1913	do.....
Pansy.....	do.....		26 0	5 3	1 3	1912	do.....
Porch.....	do.....		26 0	5 3	1 3	1911	do.....
Peony.....	do.....		26 0	5 3	1 3	1912	do.....
Peplin.....	do.....		28 0	5 2	1 3	1913	St. Paul, Minn.
Pink.....	do.....		26 0	5 3	1 3	1912	Keokuk, Iowa
Polly.....	do.....						
Rock Island Rapids.....	do.....		22 0	4 0	2 0	1909	Newport, Ky.
Rose.....	do.....		28 0	6 0	1 8	1912	Keokuk, Iowa
Sally.....	do.....						
Shad.....	do.....		26 0	5 3	1 3	1910	Keokuk, Iowa
Sparrow.....	do.....						
Swallow.....	do.....		20 0	5 10	1 7	1908	Keokuk, Iowa
Swift.....	do.....						
Tilly.....	do.....						
Trout.....	do.....		26 0	5 3	1 3	1910	Keokuk, Iowa
Violet.....	do.....		26 0	5 3	1 3	1912	do.....
Wacouta.....	do.....		28 0	5 2	1 3	1913	St. Paul, Minn.
Wasp.....	do.....		26 0	5 3	1 3	1909	Keokuk, Iowa
Wren.....	do.....						
Beetle.....	do.....		26 0	5 1	1 5	1908	Keokuk, Iowa
Bittern.....	do.....		20 0	5 9	1 8	1911	Rock Falls, Ill.
Coot.....	do.....		20 0	5 9	1 8	1912	do.....
Crane.....	do.....		20 0	5 9	1 8	1912	do.....
Curlew.....	do.....		20 0	5 9	1 8	1911	do.....
Firefly.....	do.....		26 0	5 1	1 5	1909	Keokuk, Iowa
Gnat.....	do.....		25 0	5 1	1 5	1909	do.....
Gull.....	do.....		20 0	5 9	1 8	1912	Rock Falls, Ill.
Locust.....	do.....		26 0	5 1	1 5	1909	Keokuk, Iowa
Loom.....	do.....		26 0	6 0	1 6	1908	do.....
Mosquito.....	do.....		26 0	5 1	1 5	1909	do.....
Moth.....	do.....		26 0	5 1	1 5	1909	do.....
Plover.....	do.....		20 0	5 9	1 8	1911	Rock Falls, Ill.
Snipe.....	do.....		20 0	5 4	2 1	1908	Keokuk, Iowa
No. 33.....	Pile driver and grader.....		60 0	18 0	4 0	1903	do.....
No. 503.....	Pile driver and derrick boat.....	58.00	66 0	22 0	4 6	1914	Milan, Ill.
No. 297.....	Derrick boat.....		70 0	26 0	4 0	1909	do.....
No. 319.....	do.....		100 0	20 0	4 6	1908	do.....
No. 476.....	do.....		110 0	24 0	5 0	1913	Keokuk, Iowa
No. 6.....	Drill boat.....		80 0	20 0	4 0	1893	do.....
No. 428.....	do.....	272.00	132 0	32 0	6 0	1912	Le Claire, Iowa
No. 208.....	Building boat.....		160 0	26 0	4 6	1903	Keokuk, Iowa
No. 309.....	do.....		140 0	22 0	4 0	1903	St. Paul, Minn.
No. 217.....	do.....		110 0	24 0	4 6	1904	do.....
No. 333.....	do.....		160 0	26 0	4 6	1909	S. Stillwater, Minn.
No. 338.....	do.....		170 0	20 0	4 0	1909	Fountain City, Wis.
No. 359.....	do.....		160 0	26 0	4 3	1911	Keokuk, Iowa
No. 368.....	do.....		160 0	26 0	4 6	1912	S. Stillwater, Minn.
No. 410.....	do.....	125	120 0	20 0	4 3	1912	Fountain City, Wis.
No. 473.....	do.....		160 0	26 0	4 3	1912	Keokuk, Iowa
No. 474.....	do.....		160 0	26 0	4 3	1912	do.....
No. 475.....	do.....		160 0	26 0	4 3	1912	do.....
No. 522.....	do.....		140 0	26 0	4 3	1915	Fountain City, Wis.
No. 348.....	Grasshopper.....		36 0	16 0	2 0	1909	do.....
No. 337.....	do.....		36 0	16 0	2 0	1909	do.....
No. 339.....	do.....		40 0	30 0	3 0	1909	Dubuque, Iowa
No. 365.....	do.....		40 0	36 0	4 0	1911	Keokuk, Iowa
No. 425.....	do.....		40 0	30 0	3 3	1912	Milan, Ill.
No. 435.....	do.....		36 0	16 0	2 0	1911	Fountain City, Wis.
No. 490.....	do.....		48 0	30 0	3 3	1912	Keokuk, Iowa
No. 491.....	do.....		48 0	30 0	3 3	1912	do.....
No. 13.....	Dump boat (90-ton).....		73 0	18 0	5 6	1909	Milan, Ill.

* Condemned 1916.

ed in the Engineer Department at large on Dec. 31, 1916—Continued.

ROCK ISLAND, ILL.—Continued.

Purchased.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Where.						
.....	Wood.	\$241.00	\$223.85	Fair..	\$79.71	Mississippi River, Missouri River to Minneapolis.
.....	do..	237.00	235.90	Good..	39.34	Do.
.....	do..	291.00	272.40	do..	81.90	Do.
.....	do..	300.00	268.35	do..	74.00	Do.
.....	do..	280.00	254.78	Fair..	74.57	Do.
St. Paul, Minn.	do..	589.00	503.24	Good..	141.96	Do.
.....	do..	282.00	256.78	do..	92.41	Do.
.....	do..	.....	.....	.....	.....	Do.
.....	Wood.	436.00	237.84	Poor..	.....	Do.
.....	do..	353.00	244.00	Good..	33.71	Do.
.....	do..	.....	.....	.....	.....	Do.
.....	Wood.	289.00	279.94	Fair..	99.78	Do.
.....	do..	.....	.....	.....	.....	Do.
.....	Wood.	200.00	40.96	Poor..	.....	Do.
.....	do..	.....	.....	.....	.....	Do.
.....	do..	363.00	238.73	Fair..	.....	Do.
.....	do..	284.00	206.03	do..	20.48	Do.
St. Paul, Minn.	do..	589.00	377.59	do..	46.01	Do.
.....	do..	350.00	94.45	do..	.....	Do.
.....	do..	.....	.....	.....	.....	Do.
.....	Wood.	200.00	154.51	do..	16.52	Illinois and Mississippi Canal.
.....	do..	333.00	174.62	do..	30.61	Do.
.....	do..	413.00	211.41	do..	41.90	Do.
.....	do..	413.00	195.77	do..	18.46	Do.
.....	do..	333.00	184.13	do..	37.05	Do.
.....	do..	300.00	180.24	do..	20.98	Do.
.....	do..	300.00	166.58	do..	21.57	Do.
.....	do..	413.00	213.64	do..	33.75	Do.
.....	do..	300.00	161.83	do..	27.52	Do.
.....	do..	200.00	181.00	do..	58.20	Do.
.....	do..	300.00	161.00	do..	17.91	Do.
.....	do..	300.00	182.69	do..	29.54	Do.
.....	do..	333.00	146.56	do..	9.37	Do.
.....	do..	200.00	159.08	do..	14.46	Do.
.....	do..	1,400.00	225.50	Good..	.....	Mississippi River, Missouri River to Minneapolis.
.....	Steel and wood	3,011.00	4,465.64	do..	1,460.53	Do.
.....	do..	.....	.....	.....	.....	Do.
.....	Wood.	1,253.00	2,101.24	Fair..	262.11	Do.
.....	do..	3,045.00	2,929.52	Good..	457.02	Do.
.....	do..	6,140.00	3,096.22	do..	.....	Do.
.....	do..	3,420.00	2,537.97	Poor..	1.00	Do.
Le Claire, Iowa.	Steel.	35,547.00	16,273.92	Good..	254.79	Do.
.....	Wood.	3,591.00	492.62	Very poor.	.....	Do.
.....	do..	2,141.00	1,761.31	Good..	29.25	Do.
.....	do..	1,361.00	979.65	Poor..	665.26	Do.
.....	do..	4,011.00	1,751.29	Good..	.....	Do.
.....	do..	1,663.00	401.82	Fair..	12.82	Do.
.....	do..	6,015.00	2,631.95	Good..	150.73	Do.
.....	do..	6,713.00	2,873.14	do..	58.90	Do.
.....	do..	2,089.00	1,786.01	do..	17.01	Do.
.....	do..	5,789.00	2,502.90	do..	.....	Do.
.....	do..	5,390.00	2,313.14	do..	25.57	Do.
.....	do..	5,217.00	2,226.45	do..	.....	Do.
.....	do..	6,297.76	4,138.48	do..	134.89	Do.
.....	do..	438.00	158.88	do..	36.68	Do.
.....	do..	443.00	138.14	Fair..	9.70	Do.
.....	do..	580.00	157.25	do..	.....	Do.
.....	do..	831.00	347.62	Good..	8.29	Do.
.....	do..	1,137.00	502.82	do..	18.74	Do.
.....	do..	300.00	143.45	do..	.....	Do.
.....	do..	1,153.00	474.11	do..	.....	Do.
.....	do..	1,417.00	606.21	do..	.....	Do.
.....	do..	1,616.00	620.26	Fair..	157.45	Do.

* Formerly barge No. 217.

TABLE III.—Statement of floating plant owned by the United States Army.

ROCK ISLAND, ILL.—Continued.

Name or number.	Type.	Displacement.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
		Long tons.	Ft. in.	Ft. in.	Ft. in.		Where.
No. 14.....	Dump boat (90-ton).....	73 0	12 0	5 6	1509		Milan, Ill.
No. 15.....	do.....	73 0	12 0	5 6	1509		do.....
No. 16.....	do.....	73 0	12 0	5 6	1507		do.....
No. 17.....	do.....	73 0	12 0	5 6	1515		do.....
No. 18.....	do.....	73 0	12 0	5 6	1515		do.....
No. 19.....	do.....	73 0	12 0	5 6	1515		do.....
No. 20.....	do.....	73 0	12 0	5 6	1515		do.....
No. 30.....	Magazine boat.....	20 0	10 0	2 3	1893		Keokuk, Ia.
No. 106 ¹	do.....	24 0	16 0	3 5	1913		Milan, Ill.
No. 511.....	do.....	28 0	6 0	2 0	1893		Keokuk, Ia.
No. 24.....	Loading boat.....	20 0	6 0	1 8	1873		do.....
No. 107.....	do.....	55 0	6 0	1 5	1913		Milan, Ill.
No. 423-1.....	do.....	55 0	6 0	1 5	1913		do.....
No. 424-2.....	do.....	100 0	20 0	4 0	1903		Keokuk, Ia.
No. 207 ¹	Spud boat.....	100 0	20 0	4 6	1902		Fountain C.
No. 275.....	do.....	50 0	12 0	4 0	1911		Milan, Ill.
No. 427.....	do.....	50 0	12 0	4 0	1911		do.....
No. 428.....	do.....	50 0	12 0	3 0	1913		Keokuk, Ia.
No. 201.....	Bounding boat.....	30 0	20 0	4 0	1904		Fountain C.
No. 20.....	Store boat.....	30 0	12 0	3 0	1908		Dubuque, Ia.
No. 214.....	do.....	30 0	12 0	3 0	1908		S. Stillwater, Ia.
No. 334.....	do.....	100 0	20 0	3 6	1907		Fountain C.
No. 335.....	do.....	50 0	20 0	3 0	1912		S. Stillwater, Ia.
No. 368.....	do.....	50 0	20 0	3 0	1911		Milan, Ill.
No. 416.....	do.....	100 0	20 0	4 0	1913		do.....
No. 506.....	do.....	34 0	14 0	3 2	1895		Keokuk, Ia.
No. 12.....	Office boat.....	64 0	18 0	3 0	1897		Fountain C.
No. 20.....	do.....	32 0	14 0	2 3	1895		Keokuk, Ia.
No. 41.....	do.....	40 0	12 0	2 0	1894		do.....
No. 48.....	do.....	40 0	12 0	2 0	1874		do.....
No. 51.....	do.....	58 0	18 0	3 6	1895		Fountain C.
No. 52.....	do.....	32 0	12 0	2 0	1893		Keokuk, Ia.
No. 66.....	do.....	66 0	18 0	3 6	1893		La Crosse, Ia.
No. 67.....	do.....	32 0	12 0	2 0	1903		Keokuk, Ia.
No. 68.....	do.....	50 0	16 0	3 0	1873		La Crosse, Ia.
No. 69.....	do.....	32 0	12 0	2 0	1893		Keokuk, Ia.
No. 81.....	do.....	32 0	12 0	2 0	1893		do.....
No. 85.....	do.....	32 0	12 0	2 0	1873		do.....
No. 86.....	do.....	32 0	12 0	2 0	1893		do.....
No. 90.....	do.....	40 0	14 0	2 0	1901		N. Ia. Cross, Ia.
No. 119.....	do.....	60 0	18 0	4 0	1902		Fountain C.
No. 204.....	do.....	36 0	12 0	2 0	1910		Dubuque, Ia.
No. 413.....	do.....	45 0	20 0	3 0	1911		Milan, Ill.
No. 415.....	do.....	40 0	14 0	3 0	1911		S. Stillwater, Ia.
No. 423.....	do.....	40 0	14 0	3 6	1912		Fountain C.
No. 430.....	do.....	36 0	12 0	3 0	1911		Dubuque, Ia.
No. 431.....	do.....	40 0	14 0	3 0	1911		Milan, Ill.
No. 432.....	do.....	40 0	14 0	3 0	1911		Keokuk, Ia.
No. 437.....	do.....	40 0	15 0	3 0	1902		do.....
No. 434.....	do.....	48 0	15 0	3 0	1902		Clinton, Ia.
Rambler.....	House boat.....	75 0	20 0	3 0	1894		Keokuk, Ia.
No. 11.....	Quarter boat.....	70 0	24 0	3 0	1893		Stillwater, Ia.
No. 17.....	do.....	75 0	20 0	3 0	1908		Keokuk, Ia.
No. 47.....	do.....	40 0	16 0	2 0	1907		La Crosse, Ia.
No. 65.....	do.....	75 0	20 0	3 0	1907		Keokuk, Ia.
No. 71.....	do.....	75 0	20 0	3 6	1907		Fountain C.
No. 75.....	do.....	50 0	12 0	3 0	1905		Milan, Ill.
No. 91.....	do.....	50 0	12 0	3 0	1910		Keokuk, Ia.
No. 92.....	do.....	70 0	20 0	3 0	1910		do.....
No. 118.....	do.....	40 0	14 0	3 6	1907		Fountain C.
No. 120.....	do.....	52 0	16 0	3 6	1903		Milan, Ill.
No. 121.....	do.....	52 0	16 0	3 6	1903		do.....
No. 122.....	do.....	52 0	16 0	3 6	1908		do.....
No. 123.....	do.....	100 0	20 0	3 0	1902		Keokuk, Ia.

¹ Condemned, 1916.

FLOATING PLANT.

3933

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

ROCK ISLAND, ILL.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	\$2,608.00	\$710.06	Fair..	\$146.56	Mississippi River, Missouri River, to Minneapolis.
		do.	2,349.00	392.71	Good..		Do.
		do.	2,430.00	950.81	do.		Do.
		do.	3,060.64	1,960.71	do.	10.38	Do.
		do.	2,935.17	1,883.82	do.	10.38	Do.
		do.	3,004.80	1,931.00	do.	10.38	Do.
		do.	2,890.63	1,857.70	do.	10.37	Do.
		do.	235.00	102.81	do.		Do.
		do.	355.00	182.48	do.	45.02	Do.
		do.	130.00	75.78	do.		Do.
		do.	130.00	89.55	do.		Do.
		do.	159.35	91.30	do.		Do.
		do.	159.35	85.74	do.		Do.
		do.	707.47	597.22	do.	191.87	Do.
		do.	1,137.20	534.77	do.	117.80	Do.
		do.	1,159.00	840.32	do.	69.40	Do.
		do.	1,188.00	639.16	do.	57.83	Do.
		do.	590.00	311.99	Fair..		Do.
		do.	915.00	583.18	Good..	22.20	Do.
		do.	1,444.00	565.22	do.	58.18	Do.
		do.	1,716.00	498.00	do.		Do.
		do.	2,189.00	909.43	do.	49.78	Do.
		do.	4,013.00	1,742.21	do.		Do.
		do.	1,082.00	493.58	do.	54.06	Do.
		do.	1,851.00	804.04	do.	10.53	Do.
		do.	195.00	63.54	do.		Do.
		do.	1,452.00	600.8	do.	143.10	Do.
		do.	532.00	88.78	Poor..		Do.
		do.	232.00	130.8	Fair..	10.98	Do.
		do.	257.00	65.4	do.		Do.
		do.	1,015.00	455.6	do.		Do.
		do.	201.00	37.6	Poor..		Do.
		do.	1,724.00	640.2	Fair..		Do.
		do.	228.00	217.1	Good..		Do.
		do.	370.00	553.2	do.	20.4	Do.
		do.	201.00	6.4	do.		Do.
		do.	201.00	277.4	do.	6.00	Do.
		do.	201.00	101.00	Fair..	2.10	Do.
		do.	201.00	68.1	Good..		Do.
		do.	292.00	244.7	do.	125.01	Do.
		do.	1,744.00	1,212.5	do.	4.65	Do.
		do.	645.00	440.7	Fair..	68.44	Do.
		do.	1,360.00	512.54	Good..	100.85	Do.
		do.	632.00	200.5	do.	48.68	Do.
		do.	652.00	334.73	do.	59.99	Do.
		do.	614.00	281.43	do.	35.28	Do.
		do.	587.00	372.70	do.	115.22	Do.
		do.	783.00	336.02	do.		Do.
		do.	878.00	358.22	do.		Do.
1907	Rock Island, Ill.	do.	1,500.00	731.32	Fair..	41.94	Illinois and Mississippi Canal.
		do.	1,675.00	426.98	do.	20.85	Mississippi River, Missouri River to Minneapolis.
1881	Stillwater, Minn.	do.	1,414.00	876.74	Good..	497.02	Do.
		do.	1,561.00	767.63	do.	312.78	Do.
		do.	416.00	462.46	do.		Do.
		do.	1,138.00	398.67	do.		Do.
		do.	700.00	673.35	do.	80.99	Do.
		do.	451.00	308.59	Fair..	17.33	Do.
		do.	384.00	221.82	Good..		Do.
		do.	1,414.00	556.40	do.		Do.
		do.	551.00	217.65	Very poor.		Do.
		do.	430.00	339.48	Fair..	72.99	Do.
1832	Rock Island, Ill.	do.	430.00	236.94	Good..		Do.
		do.	430.00	284.63	Fair..	43.24	Do.
		do.	2,688.00	920.79	Good..		Do.

* Formerly barge No. 207.

TABLE III.—Statement of floating plant owned by the United States

ROCK ISLAND, ILL.—Continued.

Name or number.	Type.	Displacement.	Dimensions.			When.	Built.	Where.
			Length.	Beam.	Depth.			
		Long tons.	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>			
No. 184.....	Quarter boat.....		60 0	18 0	3 0	1910		Milan, Ill.....
No. 202.....	do.....		70 0	20 0	3 0	1907		Fountain City.
No. 211 (Sangamon).....	do.....		100 0	20 0	4 3	1904		Kampsville, Ill.....
No. 212 (La Salle).....	do.....							
No. 217.....	do.....		68 0	22 0	3 0	1907		S. Stillwater, Minn.....
No. 262.....	do.....		68 0	22 0	3 0	1907		Fountain City.
No. 301.....	do.....		75 0	20 0	4 0	1907		Keokuk, Iowa.....
No. 312.....	do.....		80 0	20 0	3 0	1910		do.....
No. 313.....	do.....		70 0	20 0	3 0	1910		Milan, Ill.....
No. 314.....	do.....		70 0	20 0	3 0	1910		do.....
No. 315.....	do.....		70 0	20 0	3 0	1911		do.....
No. 316.....	do.....		80 0	20 0	3 0	1911		Keokuk, Iowa.....
No. 317.....	do.....		80 0	20 0	3 0	1911		do.....
No. 318.....	do.....		80 0	20 0	3 0	1911		do.....
No. 367.....	do.....		78 0	26 0	3 0	1912		South Stillwater, Minn.....
No. 411.....	do.....		78 0	26 0	4 0	1910		Fountain City.
No. 412.....	do.....		82 0	20 0	3 0	1911		Dubuque, Iowa.....
No. 414.....	do.....		70 0	20 0	3 0	1911		Milan, Ill.....
No. 492.....	do.....		70 9	18 0	3 6	1912		Fountain City.
No. 504.....	do.....		75 0	20 0	3 0	1913		Milan, Ill.....
No. 505.....	do.....		75 0	20 0	3 0	1913		do.....
No. 512.....	do.....		76 0	18 0	3 8	1913		Fountain City.
No. 513.....	do.....		76 0	18 0	3 8	1914		do.....
No. 514.....	do.....		76 0	18 0	3 8	1914		do.....
No. 238.....	Fuel flat (50-ton).....	18.00	68 0	16 0	4 6	1909		South Stillwater, Minn.....
No. 239.....	do.....	18.00	68 0	16 0	4 6	1909		do.....
No. 263.....	do.....	18.00	68 0	16 0	4 6	1909		Fountain City.
No. 264.....	do.....	18.00	68 0	16 0	4 6	1909		do.....
No. 372.....	Fuel flat (150-ton).....	50.00	110 0	24 0	5 0	1909		Keokuk, Iowa.....
No. 330.....	Fuel flat (50-ton).....	18.00	68 0	16 0	4 6	1909		Fountain City.
No. 331.....	do.....	18.00	68 0	16 0	4 6	1909		do.....
No. 335.....	Fuel flat (150-ton).....	50.00	104 0	24 0	5 0	1910		Keokuk, Iowa.....
No. 334.....	do.....	50.00	104 0	24 0	5 0	1911		do.....
No. 357.....	do.....	50.00	104 0	24 0	5 0	1912		do.....
No. 358.....	do.....	50.00	104 0	24 0	5 0	1912		do.....
No. 369.....	Fuel flat (50-ton).....	18.00	68 0	16 0	4 9	1912		South Stillwater, Minn.....
No. 370.....	do.....	18.00	68 0	16 0	4 9	1912		do.....
No. 408.....	Fuel flat (65-ton).....	25.00	80 0	20 0	4 8	1911		Fountain City.
No. 409.....	do.....	25.00	80 0	20 0	4 8	1911		do.....
No. 486.....	Fuel flat (150-ton).....	50.00	104 0	24 0	5 0	1913		Milan, Ill.....
No. 487.....	do.....	50.00	104 0	24 0	5 0	1913		do.....
No. 488.....	do.....	50.00	104 0	24 0	5 0	1913		do.....
No. 489.....	Fuel flat (65-ton).....	25.00	80 0	21 0	5 4	1913		do.....
No. 494.....	do.....	25.00	80 0	21 0	5 4	1913		do.....
No. 495.....	Fuel flat (150-ton).....	50.00	104 0	24 0	5 4	1913		do.....
No. 496.....	do.....	50.00	104 0	24 0	5 4	1913		do.....
No. 497.....	do.....	50.00	104 0	24 0	5 4	1913		do.....
No. 498.....	do.....	50.00	104 0	24 0	5 4	1913		do.....
No. 499.....	do.....	50.00	104 0	24 0	5 4	1913		do.....
No. 500.....	do.....	50.00	104 0	24 0	5 4	1913		do.....
No. 501.....	do.....	50.00	104 0	24 0	5 4	1913		do.....
No. 502.....	do.....	50.00	104 0	24 0	5 4	1913		Keokuk, Iowa.....
No. 523.....	Fuel flat (50-ton).....	68 0	16 0	4 6	1915			Fountain City.
No. 524.....	do.....	68 0	16 0	4 6	1915			do.....
No. 525.....	do.....	68 0	16 0	4 6	1915			do.....
1 M. S.....	Barge (100-ton).....	34.00	100 0	20 0	4 7	1910		Milan, Ill.....
2 M. S.....	do.....	34.00	100 0	20 0	4 7	1910		do.....
3 M. S.....	do.....	34.00	100 0	20 0	4 7	1910		do.....
4 M. S.....	do.....	34.00	100 0	20 0	4 7	1910		do.....
G.....	Barge (10-ton).....	6.00	45 0	12 0	3 0	1907		Keokuk, Iowa.....
L ¹	Barge (150-ton).....							
No. 4.....	do.....	51.00	110 0	21 0	4 6	1909		Dubuque, Iowa.....

¹ Condemned.

ed in the Engineer Department at large on Dec. 31, 1916—Continued.

ROCK ISLAND, ILL.—Continued.

Purchased.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Where.						
.....	Wood.	\$871.00	\$68.72	Good.	\$77.44	Mississippi River, Missouri River to Minneapolis.
Illinois River	do.	1,329.00	672.46	Fair	74.76	Do.
do.	do.	2,970.00	1,207.08	Good	29.99	Do.
.....	Wood.	3,929.00	1,298.27	Good	43.20	Do.
do.	do.	2,492.00	1,142.57	do.	134.73	Do.
do.	do.	3,027.00	1,412.38	do.	127.04	Do.
do.	do.	3,402.00	1,327.08	do.	58.57	Do.
do.	do.	3,003.00	893.50	do.	60.10	Do.
do.	do.	2,993.00	1,329.94	do.	4.49	Do.
do.	do.	2,474.00	1,270.44	do.	80.08	Do.
do.	do.	3,604.00	1,289.21	do.	2.70	Do.
do.	do.	3,382.00	1,120.14	do.	59.80	Do.
do.	do.	3,748.00	1,429.01	do.	148.30	Do.
do.	do.	5,678.00	2,468.38	do.	149.92	Do.
do.	do.	2,624.00	1,164.78	do.	41.95	Do.
do.	do.	3,748.00	1,663.25	do.	87.10	Do.
do.	do.	3,105.00	2,225.69	do.	183.18	Do.
do.	do.	3,148.00	2,012.20	do.	165.27	Do.
do.	do.	4,011.00	2,053.49	do.	.....	Do.
do.	do.	3,501.00	1,827.07	do.	8.74	Do.
do.	do.	4,306.00	2,346.62	do.	132.01	Do.
do.	do.	4,303.00	2,850.98	do.	121.32	Do.
do.	do.	4,300.00	2,837.42	do.	106.94	Do.
do.	do.	758.00	234.46	do.	4.75	Do.
do.	do.	793.00	213.42	do.	10.78	Do.
do.	do.	702.00	230.61	do.	15.30	Do.
do.	do.	693.00	230.57	do.	16.05	Do.
do.	do.	1,768.00	662.42	do.	36.12	Do.
do.	do.	717.00	220.71	do.	13.49	Do.
do.	do.	718.00	255.89	do.	54.26	Do.
do.	do.	2,283.00	927.27	do.	63.72	Do.
do.	do.	2,105.00	962.71	do.	.....	Do.
do.	do.	2,332.00	955.60	do.	.....	Do.
do.	do.	2,340.00	971.86	do.	.....	Do.
do.	do.	952.00	401.54	do.	17.39	Do.
do.	do.	1,059.00	433.66	do.	.....	Do.
do.	do.	1,146.00	476.37	do.	10.41	Do.
do.	do.	1,191.28	481.27	do.	10.25	Do.
do.	do.	2,160.00	849.02	do.	.....	Do.
do.	do.	2,252.00	935.99	do.	.....	Do.
do.	do.	2,257.00	1,155.57	do.	.....	Do.
do.	do.	1,628.00	802.46	do.	117.66	Do.
do.	do.	1,650.00	675.84	do.	.....	Do.
do.	do.	2,371.00	1,282.52	do.	85.71	Do.
do.	do.	2,253.00	1,153.54	do.	.....	Do.
do.	do.	2,144.00	1,097.73	do.	.....	Do.
do.	do.	2,172.00	1,136.32	do.	30.60	Do.
do.	do.	2,203.00	1,188.63	do.	42.77	Do.
do.	do.	2,223.00	1,138.22	do.	.....	Do.
do.	do.	2,344.00	1,250.15	do.	31.99	Do.
do.	do.	2,240.00	945.74	do.	41.69	Do.
do.	do.	794.67	508.56	do.	.....	Do.
do.	do.	793.83	511.95	do.	4.88	Do.
do.	do.	795.16	512.80	do.	4.87	Do.
do.	do.	1,032.00	481.14	do.	72.38	Illinois and Mississippi Canal.
do.	do.	1,238.00	559.77	do.	26.98	Do.
do.	do.	1,575.00	610.76	do.	56.87	Do.
do.	do.	1,610.00	652.45	do.	31.33	Do.
do.	do.	207.00	74.98	Very poor.	4.00	Des Moines Rapids Canal.
do.	Wood.	1,460.00	749.38	Poor	35.42	Mississippi River, Missouri River to Minneapolis.

* Condemned 1916.

TABLE III.—Statement of floating plant owned by the United States and
ROCK ISLAND, ILL.—Continued.

Name or number.	Type.	Dis- place- ment.	Dimensions.				When.	Built. Where.
			Length.	Beam.	Depth.			
No. 7.....	Barge (150-ton).....	Long tons.	51.00	110 0	24 0	4 6	1900	Dubuque, Iowa....
No. 153.....	do.....	51.00	110 0	24 0	4 6	1909	do.....	do.....
No. 161.....	do.....	51.00	110 0	24 0	4 6	1910	do.....	do.....
No. 170 ¹	Barge (100-ton).....							
No. 186.....	do.....	36.00	100 0	20 0	4 0	1906		Milan, Ill.....
No. 206 ¹	do.....							
No. 210.....	do.....	36.00	100 0	20 0	4 0	1903		St. Paul, Minn.....
No. 211.....	do.....	36.00	100 0	20 0	4 0	1903		do.....
No. 212.....	do.....	36.00	100 0	20 0	4 0	1903		do.....
No. 213.....	do.....	36.00	100 0	20 0	4 0	1903		do.....
No. 214.....	do.....	51.00	110 0	24 0	4 6	1903		do.....
No. 215.....	Barge (180-ton).....	51.00	110 0	24 0	4 6	1904		do.....
No. 216 ¹	do.....							
No. 218 ¹	do.....							
No. 219.....	do.....	51.00	110 0	24 0	4 6	1904		St. Paul, Minn.....
No. 221 ¹	Barge (100-ton).....							
No. 222 ¹	do.....							
No. 225.....	Barge (175-ton).....	125.00	120 0	20 0	4 0	1904		Fountain City, Wis.
No. 226.....	Barge (100-ton).....	36.00	100 0	20 0	4 0	1904		do.....
No. 227.....	do.....	36.00	100 0	20 0	4 0	1904		do.....
No. 228.....	do.....	36.00	100 0	20 0	4 0	1904		do.....
No. 229.....	do.....	36.00	100 0	20 0	4 0	1904		do.....
No. 240.....	Barge (150-ton).....	51.00	110 0	24 0	5 0	1906		South Sullwater, Minn.....
No. 241.....	do.....	51.00	110 0	24 0	5 0	1906		do.....
No. 242.....	do.....	51.00	110 0	24 0	5 0	1906		do.....
No. 243.....	do.....	51.00	110 0	24 0	5 0	1906		do.....
No. 244.....	do.....	51.00	110 0	24 0	5 0	1906		do.....
No. 245.....	do.....	51.00	110 0	24 0	5 0	1906		do.....
No. 246.....	do.....	51.00	110 0	24 0	5 0	1906		do.....
No. 247.....	do.....	51.00	110 0	24 0	5 0	1906		do.....
No. 248.....	do.....	51.00	110 0	24 0	5 0	1906		do.....
No. 249.....	do.....	51.00	110 0	24 0	5 0	1906		do.....
No. 250.....	do.....	51.00	110 0	24 0	5 0	1906		do.....
No. 251.....	do.....	51.00	110 0	24 0	5 0	1906		do.....
No. 252.....	do.....	51.00	110 0	24 0	5 0	1906		do.....
No. 253.....	do.....	51.00	110 0	24 0	5 0	1906		do.....
No. 254.....	do.....	51.00	110 0	24 0	5 0	1906		do.....
No. 255.....	do.....	51.00	110 0	24 0	5 0	1906		do.....
No. 256.....	do.....	51.00	110 0	24 0	5 0	1906		do.....
No. 257.....	do.....	51.00	110 0	24 0	5 0	1906		do.....
No. 258.....	do.....	51.00	110 0	24 0	5 0	1906		do.....
No. 259.....	do.....	51.00	110 0	24 0	5 0	1906		do.....
No. 265.....	Barge (100 ton).....	36.00	100 0	20 0	4 6	1903		Fountain City, Wis.
No. 266.....	do.....	36.00	100 0	20 0	4 6	1908		do.....
No. 267.....	do.....	33.00	100 0	20 0	4 6	1903		do.....
No. 268.....	do.....	33.00	100 0	20 0	4 0	1908		do.....
No. 269.....	do.....	36.00	100 0	20 0	4 6	1909		do.....
No. 270.....	do.....	36.00	100 0	20 0	4 0	1909		do.....
No. 271.....	do.....	36.00	100 0	20 0	4 6	1909		do.....
No. 272.....	do.....	36.00	100 0	20 0	4 6	1909		do.....
No. 273.....	do.....	36.00	100 0	20 0	4 6	1909		do.....
No. 274.....	do.....	33.00	100 0	20 0	4 0	1909		do.....
No. 275.....	do.....	36.00	100 0	20 0	4 6	1909		do.....
No. 277.....	do.....	36.00	100 0	20 0	4 6	1909		do.....
No. 278.....	do.....	33.00	100 0	20 0	4 6	1909		do.....
No. 279.....	do.....	36.00	100 0	20 0	4 6	1909		do.....
No. 280.....	do.....	36.00	100 0	20 0	4 6	1909		do.....
No. 281.....	do.....	36.00	100 0	20 0	4 6	1909		do.....
No. 282.....	do.....	36.00	100 0	20 0	4 6	1909		do.....
No. 283.....	do.....	36.00	100 0	20 0	4 6	1909		do.....
No. 284.....	do.....	36.00	100 0	20 0	4 6	1909		do.....
No. 285.....	do.....	33.00	100 0	20 0	4 0	1903		do.....
No. 286.....	do.....	36.00	100 0	20 0	4 6	1908		Milan, Ill.....
No. 287.....	do.....	36.00	100 0	20 0	4 0	1908		do.....
No. 288.....	do.....	36.00	100 0	20 0	4 6	1908		do.....
No. 289.....	do.....	36.00	100 0	20 0	4 6	1908		do.....
No. 290.....	do.....	36.00	100 0	20 0	4 6	1908		do.....

¹ Condemned 1916.

ed in the Engineer Department at large on Dec. 31, 1916--Continued.

ROCK ISLAND, ILL.--Continued.

Purchased.					Cost of repairs, additions, and re-building during calendar year.	Work to which belonging.
Where.	Material.	First cost.	Estimated value.	Condition.		
Quincy, Ill.	Wood.	\$1,447.00	\$699.78	Fair.		Mississippi River, Missouri River to Minneapolis.
Stillwater, Minn.	do.	1,600.00	655.82	Good.	\$14.76	Do.
Rock Island, Ill.	Wood.	790.00	155.67	Poor.	12.19	Do.
St. Paul, Minn.	Wood.	910.00	413.79	Fair.		Do.
do.	do.	910.00	452.70	do.		Do.
do.	do.	910.00	495.28	do.		Do.
do.	do.	910.00	357.69	do.		Do.
do.	do.	1,361.00	434.67	do.		Do.
do.	do.	1,361.00	371.78	do.		Do.
St. Paul, Minn.	Wood.	1,361.00	398.74	Fair.		Do.
do.	Wood.	1,076.00	401.11	Fair.		Do.
do.	do.	801.00	424.14	do.	75.83	Do.
do.	do.	840.00	373.43	do.	34.23	Do.
do.	do.	828.00	427.95	do.	119.80	Do.
do.	do.	828.00	447.76	Good.		Do.
do.	do.	2,130.00	785.87	Fair.		Do.
do.	do.	1,830.00	871.42	Good.	169.62	Do.
do.	do.	1,807.00	737.51	do.		Do.
do.	do.	1,739.00	879.42	Fair.	218.63	Do.
do.	do.	1,758.00	759.98	do.		Do.
do.	do.	1,669.00	867.78	do.	120.92	Do.
do.	do.	1,608.00	675.54	do.	6.52	Do.
do.	do.	1,662.00	691.12	Good.		Do.
do.	do.	1,677.00	669.33	Fair.		Do.
do.	do.	1,675.00	720.14	Good.		Do.
do.	do.	1,622.00	651.26	Fair.	9.21	Do.
do.	do.	1,617.00	733.22	Good.	35.50	Do.
do.	do.	1,719.00	719.15	do.		Do.
do.	do.	1,618.00	672.70	Fair.	33.44	Do.
do.	do.	1,659.00	623.02	do.	27.67	Do.
do.	do.	1,650.00	619.74	do.	6.78	Do.
do.	do.	1,649.00	615.71	do.	33.76	Do.
do.	do.	1,611.00	636.48	do.	24.20	Do.
do.	do.	1,680.00	632.53	do.		Do.
do.	do.	1,639.00	776.94	do.	3.32	Do.
do.	do.	1,159.00	446.63	do.	10.70	Do.
do.	do.	1,155.00	479.52	do.	74.30	Do.
do.	do.	1,098.00	426.15	do.		Do.
do.	do.	1,160.00	428.63	do.	23.70	Do.
do.	do.	1,136.00	469.83	do.	38.62	Do.
do.	do.	1,160.00	508.07	do.	16.27	Do.
do.	do.	1,155.00	460.84	do.	20.64	Do.
do.	do.	1,161.00	631.39	Good.	139.80	Do.
do.	do.	1,153.00	665.43	do.	163.42	Do.
do.	do.	1,155.00	453.73	Fair.	11.69	Do.
do.	do.	1,164.00	437.85	Good.		Do.
do.	do.	1,194.00	437.76	do.		Do.
do.	do.	1,203.00	361.43	Fair.		Do.
do.	do.	1,187.00	436.91	Good.		Do.
do.	do.	1,169.00	437.55	do.		Do.
do.	do.	1,171.00	437.76	do.		Do.
do.	do.	1,145.00	454.24	Fair.	11.69	Do.
do.	do.	1,169.00	453.23	do.	11.69	Do.
do.	do.	1,176.00	437.44	do.		Do.
do.	do.	1,207.00	647.75	do.	134.22	Do.
do.	do.	1,151.00	423.94	Good.	23.56	Do.
do.	do.	1,140.00	528.23	Fair.	212.67	Do.
do.	do.	1,130.00	896.14	do.	319.40	Do.
do.	do.	1,112.00	599.49	do.	80.05	Do.
do.	do.	1,193.00	1,046.45	do.	731.67	Do.

TABLE III.—Statement of floating plant owned by the United States Army.

ROCK ISLAND, ILL.—Continued.

Name or number.	Type.	Displacement.	Dimensions.				When.	Built.
			Length.	Beam.	Depth.			
		Long tons.	Ft. in.	Ft. in.	Ft. in.			
No. 291.....	Barge (100-ton).....	36.00 100	0	20 0	4 6	1908		Milan, Ill.
No. 292.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 293.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 294.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 295.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 296.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 298.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 299.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 303.....	do.....	36.00 100	0	20 0	4 6	1908		Keokuk, Ia.
No. 304.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 305.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 306.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 307.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 308.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 309.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 310.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 311.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 312.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 313.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 314.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 315.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 316.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 317.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 320.....	do.....	36.00 100	0	20 0	4 6	1908		Stillwater,
No. 321.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 322.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 323.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 324.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 325.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 326.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 327.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 328.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 329.....	do.....	36.00 100	0	20 0	4 6	1908		do.....
No. 340.....	Barge (30-ton).....	20.00 60	0	15 0	3 0	1910		South S. Minn.
No. 341.....	Barge (8-ton).....	10.00 29	0	8 0	1 6	1910		do.....
No. 360.....	Barge (100-ton).....	36.00 100	0	20 0	4 6	1911		Keokuk, Ia.
No. 361.....	do.....	36.00 100	0	20 0	4 6	1912		do.....
No. 362.....	do.....	36.00 100	0	20 0	4 6	1912		do.....
No. 363.....	do.....	36.00 100	0	20 0	4 6	1912		do.....
No. 364.....	do.....	36.00 100	0	20 0	4 6	1912		do.....
No. 371.....	do.....	36.00 100	0	20 0	4 6	1912		South S. Minn.
No. 372.....	do.....	36.00 100	0	20 0	4 6	1912		do.....
No. 373.....	do.....	36.00 100	0	20 0	4 6	1912		do.....
No. 374.....	do.....	36.00 100	0	20 0	4 6	1912		do.....
No. 375.....	do.....	36.00 100	0	20 0	4 6	1912		do.....
No. 376.....	do.....	36.00 100	0	20 0	4 6	1912		do.....
No. 377.....	do.....	36.00 100	0	20 0	4 6	1912		do.....
No. 378.....	do.....	36.00 100	0	20 0	4 6	1912		do.....
No. 379.....	do.....	36.00 100	0	20 0	4 6	1912		do.....
No. 380.....	do.....	36.00 100	0	20 0	4 6	1912		do.....
No. 381.....	do.....	36.00 100	0	20 0	4 6	1912		do.....
No. 382.....	do.....	36.00 100	0	20 0	4 6	1912		do.....
No. 383.....	do.....	36.00 100	0	20 0	4 6	1912		do.....
No. 384.....	do.....	36.00 100	0	20 0	4 6	1912		do.....
No. 385.....	do.....	36.00 100	0	20 0	4 6	1912		do.....
No. 386.....	Barge (150-ton).....	51.00 110	0	24 0	5 0	1912		do.....
No. 387.....	do.....	51.00 110	0	24 0	5 0	1912		do.....
No. 388.....	do.....	51.00 110	0	24 0	5 0	1912		do.....
No. 389.....	do.....	51.00 110	0	24 0	5 0	1912		do.....
No. 390.....	do.....	51.00 110	0	24 0	5 0	1912		do.....
No. 391.....	do.....	51.00 110	0	24 0	5 0	1912		do.....
No. 392.....	Barge (100-ton).....	36.00 100	0	20 0	4 7	1912		Fountain City
No. 393.....	do.....	36.00 100	0	20 0	4 7	1911		do.....
No. 394.....	do.....	36.00 100	0	20 0	4 7	1911		do.....
No. 395.....	do.....	36.00 100	0	20 0	4 7	1911		do.....
No. 396.....	do.....	36.00 100	0	20 0	4 7	1911		do.....
No. 397.....	do.....	36.00 100	0	20 0	4 7	1911		do.....
No. 398.....	do.....	36.00 100	0	20 0	4 7	1911		do.....

and in the Engineer Department at large on Dec. 31, 1916—Continued.

ROCK ISLAND, ILL.—Continued.

Purchased.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Where.						
	Wood.	\$1,100.00	\$419.64	Fair..		Mississippi River, Missouri River to Minneapolis.
..do..		1,111.00	807.28	..do..	\$363.35	Do.
..do..		1,103.00	849.77	..do..	383.49	Do.
..do..		1,106.00	454.65	..do..		Do.
..do..		1,120.00	745.34	..do..	287.82	Do.
..do..		1,101.00	899.18	..do..	364.36	Do.
..do..		1,148.00	640.17	..do..	219.75	Do.
..do..		1,120.00	901.10	..do..	388.94	Do.
..do..		1,458.00	642.54	..do..	96.97	Do.
..do..		1,420.00	804.21	Good..	40.82	Do.
..do..		1,188.00	399.22	..do..	116.35	Do.
..do..		1,188.00	574.13	..do..	69.16	Do.
..do..		1,082.00	546.98	Fair..	41.10	Do.
..do..		1,072.00	569.30	Good..	129.07	Do.
..do..		1,031.00	584.35	..do..	55.63	Do.
..do..		1,056.00	456.79	Fair..	91.65	Do.
..do..		1,123.00	445.95	..do..	79.81	Do.
..do..		1,080.00	514.18	Good..	60.54	Do.
..do..		1,101.00	442.54	Fair..	74.98	Do.
..do..		1,192.00	489.21	Good..	72.14	Do.
..do..		1,177.00	657.59	..do..	50.97	Do.
..do..		1,244.00	588.88	..do..	74.83	Do.
..do..		1,130.00	572.20	..do..	195.89	Do.
..do..		1,116.00	430.63	..do..		Do.
..do..		1,145.00	434.25	..do..		Do.
..do..		1,044.00	427.51	..do..		Do.
..do..		1,041.00	405.92	..do..		Do.
..do..		1,011.00	433.18	..do..		Do.
..do..		1,034.00	428.10	..do..		Do.
..do..		1,008.00	423.14	..do..		Do.
..do..		998.00	423.01	..do..		Do.
..do..		997.00	428.11	..do..		Do.
..do..		1,012.00	467.54	..do..		Do.
..do..		432.00	143.36	..do..		Do.
..do..		140.00	50.18	..do..	24.32	Do.
..do..		1,637.00	732.19	..do..	25.58	Do.
..do..		1,777.00	785.96	..do..	39.67	Do.
..do..		1,683.00	775.98	..do..	35.62	Do.
..do..		1,581.00	759.47	..do..	58.83	Do.
..do..		1,675.00	801.38	..do..	25.39	Do.
..do..		1,746.00	752.48	..do..	34.27	Do.
..do..		1,649.00	686.40	..do..		Do.
..do..		1,588.00	688.22	..do..	34.27	Do.
..do..		1,547.00	613.19	..do..		Do.
..do..		1,515.00	644.32	..do..		Do.
..do..		1,495.00	633.47	..do..		Do.
..do..		1,537.00	680.08	..do..	11.69	Do.
..do..		1,477.00	628.76	..do..	14.75	Do.
..do..		1,469.00	611.23	..do..		Do.
..do..		1,482.00	671.74	..do..	15.42	Do.
..do..		1,412.00	583.68	..do..		Do.
..do..		1,515.00	625.65	..do..		Do.
..do..		1,447.00	626.43	..do..		Do.
..do..		1,561.00	649.09	..do..		Do.
..do..		1,562.00	649.69	..do..		Do.
..do..		2,202.00	938.47	..do..		Do.
..do..		2,038.00	834.56	..do..		Do.
..do..		1,928.00	871.14	..do..		Do.
..do..		1,953.00	816.55	..do..		Do.
..do..		2,028.00	830.46	..do..		Do.
..do..		2,375.00	982.35	..do..		Do.
..do..		1,248.00	531.94	..do..	11.69	Do.
..do..		1,290.00	541.48	Fair..	11.69	Do.
..do..		1,242.00	541.31	Good..	11.69	Do.
..do..		1,280.00	550.13	..do..	11.69	Do.
..do..		1,312.00	629.28	..do..	65.97	Do.
..do..		1,323.00	574.18	..do..	11.69	Do.
..do..		1,310.00	560.35	..do..	11.69	Do.

TABLE III.—Statement of floating plant owned by the United

ROCK ISLAND, ILL.—Continued.

Name or number.	Type.	Displacement.	Dimensions.				When built.	Where built.
			Length.	Beam.	Depth.	When		
No. 399.....	Barge (100-ton).....	Long tons. 36.00	Ft. in. 100 0	Ft. in. 20 0	Ft. in. 4 7	1911	Fountain	
No. 400.....	do.....	36.00	100 0	20 0	4 7	1911	do.....	
No. 401.....	do.....	36.00	100 0	20 0	4 7	1911	do.....	
No. 402.....	do.....	36.00	100 0	20 0	4 7	1911	do.....	
No. 403.....	do.....	36.00	100 0	20 0	4 7	1911	do.....	
No. 404.....	do.....	36.00	100 0	20 0	4 7	1911	do.....	
No. 405.....	do.....	36.00	100 0	20 0	4 7	1911	do.....	
No. 406.....	do.....	36.00	100 0	20 0	4 7	1911	do.....	
No. 407.....	do.....	36.00	100 0	20 0	4 7	1911	do.....	
No. 417.....	do.....	36.00	100 0	20 0	4 7	1911	do.....	
No. 418.....	do.....	36.00	100 0	20 0	4 7	1911	do.....	
No. 419.....	do.....	36.00	100 0	20 0	4 7	1911	do.....	
No. 420.....	do.....	36.00	100 0	20 0	4 7	1911	do.....	
No. 421.....	do.....	36.00	100 0	20 0	4 7	1911	do.....	
No. 422.....	do.....	36.00	100 0	20 0	4 7	1911	do.....	
No. 423.....	do.....	36.00	100 0	20 0	4 7	1911	do.....	
No. 424.....	do.....	36.00	100 0	20 0	4 7	1911	do.....	
No. 436.....	do.....	36.00	100 0	20 0	4 7	1912	Fountain	
No. 437.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 438.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 439.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 440.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 441.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 442.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 443.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 444.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 445.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 446.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 447.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 448.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 449.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 450.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 451.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 452.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 453.....	do.....	36.00	100 0	20 0	4 7	1914	do.....	
No. 454.....	Barge (100-ton).....	51.00	110 0	24 0	5 0	1912	do.....	
No. 455.....	do.....	51.00	110 0	24 0	5 0	1912	do.....	
No. 456.....	do.....	51.00	110 0	24 0	5 0	1912	do.....	
No. 457.....	do.....	51.00	110 0	24 0	5 0	1912	do.....	
No. 458.....	Barge (100-ton).....	36.00	100 0	20 0	4 7	1912	do.....	
No. 459.....	do.....	36.00	100 0	20 0	4 7	1912	do.....	
No. 460.....	do.....	36.00	100 0	20 0	4 7	1912	do.....	
No. 461.....	do.....	36.00	100 0	20 0	4 7	1912	do.....	
No. 462.....	do.....	36.00	100 0	20 0	4 7	1912	do.....	
No. 463.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 464.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 465.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 466.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 467.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 468.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 469.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 470.....	do.....	36.00	100 0	20 0	4 7	1913	do.....	
No. 471.....	do.....	36.00	100 0	20 0	4 7	1914	do.....	
No. 472.....	do.....	36.00	100 0	20 0	4 7	1914	do.....	
No. 477.....	Barge (150-ton).....	51.00	110 0	24 0	5 0	1912	do.....	
No. 478.....	do.....	51.00	110 0	24 0	5 0	1912	do.....	
No. 479.....	do.....	51.00	110 0	24 0	5 0	1912	do.....	
No. 480.....	do.....	51.00	110 0	24 0	5 0	1912	do.....	
No. 481.....	do.....	51.00	110 0	24 0	5 0	1912	do.....	
No. 482.....	do.....	51.00	110 0	24 0	5 0	1912	do.....	
No. 483.....	do.....	51.00	110 0	24 0	5 0	1913	do.....	
No. 484.....	do.....	51.00	110 0	24 0	5 0	1913	do.....	
No. 485.....	do.....	51.00	110 0	24 0	5 0	1913	do.....	
No. 507.....	Barge (30-ton).....	8.00	50 0	14 0	3 0	1913	do.....	
No. 508.....	do.....	8.00	50 0	14 0	3 0	1913	do.....	
No. 509.....	do.....	8.00	50 0	14 0	3 0	1913	do.....	
No. 510.....	do.....	10.00	60 0	20 0	3 0	1913	do.....	
No. 515.....	Flat barge.....	6.00	30 0	8 0	2 3	1914	Fountain	
No. 516.....	do.....	6.00	30 0	8 0	2 3	1914	do.....	
No. 517.....	do.....	6.00	30 0	8 0	2 3	1914	do.....	
No. 518.....	do.....	6.00	30 0	8 0	2 3	1914	do.....	

employed in the Engineer Department at large on Dec. 31, 1916.—Continued.

ROCK ISLAND, ILL.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	\$1,418.00	\$337.40	Good.	\$11.60	Mississippi River, Missouri
		do.	1,424.00	558.80	do.	11.60	do.
		do.	1,411.00	577.04	do.	11.60	do.
		do.	1,455.00	589.81	do.	11.60	do.
		do.	1,461.00	577.08	do.	11.60	do.
		do.	1,455.00	573.80	do.	11.60	do.
		do.	1,451.00	582.58	do.	11.60	do.
		do.	1,445.00	577.11	do.	11.60	do.
		do.	1,442.00	592.14	do.	11.60	do.
		do.	1,631.00	600.95	do.	11.60	do.
		do.	1,476.00	667.58	do.	11.60	do.
		do.	1,511.00	657.16	do.	11.60	do.
		do.	1,460.00	678.17	do.	11.60	do.
		do.	1,500.00	686.08	do.	11.60	do.
		do.	1,534.00	649.66	do.	11.60	do.
		do.	1,537.00	673.72	do.	11.60	do.
		do.	1,536.00	634.30	do.	11.60	do.
		do.	1,398.00	584.56	do.	11.60	do.
		do.	1,416.00	586.43	do.	11.60	do.
		do.	1,426.00	597.82	do.	11.60	do.
		do.	1,413.00	597.81	do.	11.60	do.
		do.	1,481.00	616.47	do.	11.60	do.
		do.	1,463.00	594.43	do.	11.60	do.
		do.	1,438.00	606.83	do.	11.60	do.
		do.	1,462.00	613.90	do.	11.60	do.
		do.	1,464.00	635.52	do.	11.60	do.
		do.	1,463.00	599.04	do.	11.60	do.
		do.	1,460.00	764.55	do.	11.60	do.
		do.	1,465.00	943.68	do.	11.60	do.
		do.	1,462.00	941.60	do.	11.60	do.
		do.	1,460.00	943.76	do.	11.60	do.
		do.	1,467.00	960.01	do.	11.60	do.
		do.	1,475.00	962.79	do.	11.60	do.
		do.	1,496.00	966.52	do.	11.60	do.
		do.	1,525.94	965.95	do.	11.60	do.
		do.	2,058.00	878.91	do.	11.60	do.
		do.	2,098.00	867.07	do.	11.60	do.
		do.	1,902.00	789.10	do.	11.60	do.
		do.	1,894.00	775.68	do.	11.60	do.
		do.	1,656.00	718.70	do.	11.60	do.
		do.	1,661.00	728.04	do.	11.60	do.
		do.	1,697.00	758.99	do.	11.60	do.
		do.	1,653.00	720.20	do.	11.60	do.
		do.	1,639.00	694.01	do.	11.60	do.
		do.	1,652.00	676.83	do.	11.60	do.
		do.	1,679.00	696.46	do.	11.60	do.
		do.	1,818.00	1,075.54	do.	11.60	do.
		do.	1,666.00	838.67	Fair.	11.60	do.
		do.	1,603.00	869.75	Good.	11.60	do.
		do.	1,673.00	939.07	do.	11.60	do.
		do.	1,706.00	873.62	do.	11.60	do.
		do.	1,647.00	848.89	do.	11.60	do.
		do.	1,677.00	894.91	do.	11.60	do.
		do.	1,812.00	966.10	do.	11.60	do.
		do.	2,352.00	965.07	do.	11.60	do.
		do.	2,391.00	942.59	do.	11.60	do.
		do.	2,234.00	914.94	do.	11.60	do.
		do.	2,246.00	920.06	do.	11.60	do.
		do.	2,173.00	902.08	do.	11.60	do.
		do.	2,134.00	873.98	do.	11.60	do.
		do.	2,144.00	894.77	do.	11.60	do.
		do.	1,999.00	818.69	do.	11.60	do.
		do.	1,961.00	811.38	do.	11.60	do.
		do.	421.00	172.54	do.	11.60	do.
		do.	409.00	182.73	do.	11.60	do.
		do.	435.00	206.21	do.	11.60	do.
		do.	785.00	321.51	do.	11.60	do.
		do.	150.00	76.80	do.	11.60	do.
		do.	150.00	76.80	do.	11.60	do.
		do.	197.00	100.85	do.	11.60	do.
		do.	171.00	87.82	do.	11.60	do.

TABLE III.—Statement of floating plant owned by the United States Army.

ROCK ISLAND, ILL.—Continued.

Name or number.	Type.	Displacement.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
No. 519.....	Flat.....	Long tons. 6.00	Ft. in. 30 0	Ft. in. 8 0	Ft. in. 2 3	1914	Milan, Ill.
No. 520.....	do.....	6.00	30 0	8 0	2 3	1914	Keokuk, Iowa
No. 521.....	do.....	6.00	30 0	8 0	2 3	1914	do.....
No. 1, U. S. E.....	Barge (80-ton).....	23.00	68 0	16 0	3 8	1908	Rock Falls, Ill.
No. 2, U. S. E.....	do.....	23.00	68 0	16 0	3 8	1908	do.....
No. 3, U. S. E.....	do.....	23.00	68 0	16 0	3 8	1908	do.....
No. 4, U. S. E.....	do.....	25.00	70 0	16 0	4 0	1908	do.....
No. 5, U. S. E.....	do.....	25.00	70 0	16 0	4 0	1908	do.....
No. 6, U. S. E.....	do.....	25.00	70 0	16 0	4 0	1908	do.....
No. 7, U. S. E.....	do.....	25.00	70 0	16 0	4 0	1908	do.....
No. 8, U. S. E.....	do.....	25.00	70 0	16 0	4 0	1908	do.....
No. 9, U. S. E.....	do.....	25.00	70 0	16 0	4 0	1908	do.....
No. 10, U. S. E.....	do.....	25.00	70 0	16 0	4 0	1908	do.....
No. 11, U. S. E.....	do.....	25.00	70 0	16 0	4 0	1908	do.....
No. 14, U. S. E.....	House boat ¹	70 0	16 0	4 0	1908	do.....	do.....
No. 16, U. S. E.....	Barge.....	26 0	5 4	1 6	1908	do.....	do.....
No. 17, U. S. E.....	Barge (80-ton).....	25.00	70 0	16 0	4 0	1909	Milan, Ill.
No. 18, U. S. E.....	do.....	25.00	70 0	16 0	4 0	1909	do.....
No. 19, U. S. E.....	do.....	25.00	70 0	16 0	4 0	1909	do.....
No. 20, U. S. E.....	do.....	25.00	70 0	16 0	4 0	1909	do.....
No. 21, U. S. E.....	do.....	25.00	70 0	16 0	4 0	1909	do.....
No. 22, U. S. E.....	do.....	25.00	70 0	16 0	4 0	1909	do.....
No. 23, U. S. E.....	do.....	25.00	70 0	16 0	4 0	1909	do.....
No. 24, U. S. E.....	do.....	25.00	70 0	16 0	4 0	1909	do.....
No. 25, U. S. E.....	House boat.....	60 0	16 0	3 0	1910	do.....	do.....
No. 26, U. S. E.....	Barge (80-ton).....	25.00	70 0	16 0	4 0	1911	do.....
No. 27, U. S. E.....	do.....	25.00	70 0	16 0	4 0	1911	do.....
No. 28, U. S. E.....	do.....	25.00	70 0	16 0	4 0	1911	do.....
No. 29, U. S. E.....	do.....	25.00	70 0	16 0	4 0	1911	do.....
No. 30, U. S. E.....	Excavator.....	59 3	30 0	4 0	1914	do.....	do.....
No number.....	Rowboat (Rock Falls).....	18 0	3 5	1 3	.....	Muscatine, Iowa	
Do.....	Rowboat (Marion).....	15 6	3 4	1 4	.....	Illinois River	
Do.....	Lifeboat (Ellen).....	15 5	4 6	1 10	1907	Grafton, Ill.	
Do.....	do.....	15 5	4 6	1 10	1907	do.....	do.....
Do.....	Lifeboat (Muscatine).....	18 0	5 5	2 4	1915	do.....	do.....
Do.....	do.....	18 0	5 5	2 4	1915	do.....	do.....
Do.....	Lifeboat (LeClaire).....	18 0	5 5	2 4	1915	do.....	do.....
Do.....	do.....	18 0	5 5	2 4	1915	do.....	do.....
Do.....	Lifeboat (Nauvoo).....	18 0	5 5	2 4	1915	do.....	do.....
Do.....	do.....	18 0	5 5	2 4	1915	do.....	do.....
Do.....	Lifeboat (Minneapolis).....	18 0	5 5	2 4	1915	do.....	do.....
Do.....	do.....	18 0	5 5	2 4	1915	do.....	do.....
Do.....	Lifeboat (snag boat).....	15 7	3 7	1 6	1907	Salem, Ohio	
Do.....	Lifeboat (Alert).....	17 10	4 6	1 1	1915	Fountain City, Mo.	
Do.....	do.....	17 9	3 8	1 1	.....	do.....	do.....
Do.....	Lifeboat (Coal Bluff).....	17 0	4 8	1 2	.....	do.....	do.....
Do.....	do.....	17 0	4 8	1 2	.....	do.....	do.....
Do.....	Lifeboat (Ellenor).....	16 0	5 0	2 0	1915	Grafton, Ill.	
Do.....	Yawl (snag boat).....	23 8	5 4	2 0	1909	St. Louis, Mo.	
Do.....	Yawl (Milan).....	26 0	5 6	1 4	1909	Keokuk, Iowa	
Do.....	Skiff (Fury).....	16 0	4 0	1 4	1904	Grafton, Ill.	
Do.....	Skiff (Davenport).....	20 6	4 9	1 4	1912	Stillwater, Minn.	
Do.....	do.....	22 0	4 10	1 9	1913	do.....	do.....
Do.....	Skiff (Ellen).....	16 2	4 0	1 2	.....	do.....	do.....
Do.....	Skiff (Apache).....	21 10	5 0	1 5	.....	do.....	do.....
Do.....	do.....	21 10	5 0	1 5	.....	do.....	do.....
Do.....	Skiff (Silver Lake).....	20 0	4 6	1 0	1910	Milan boat yard	

¹ Formerly X.

ed in the Engineer Department at large on Dec. 31, 1916—Continued.

ROCK ISLAND, ILL.—Continued.

Purchased.						
Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
.....	Wood.	\$167.00	\$94.10	Good	\$10.97	Mississippi River, Missouri River to Minneapolis.
.....	do.	150.00	85.77	do.	.....	Do.
.....	do.	150.00	87.87	do.	.....	Do.
.....	do.	550.00	88.64	Fair	.....	Illinois and Mississippi Canal.
.....	do.	550.00	120.39	do.	.....	Do.
.....	do.	550.00	173.37	do.	46.13	Do.
.....	do.	550.00	257.05	do.	35.20	Do.
.....	do.	550.00	158.38	Good	36.76	Do.
.....	do.	550.00	334.90	Fair	.....	Do.
.....	do.	550.00	193.18	do.	.....	Do.
.....	do.	550.00	170.23	do.	31.70	Do.
.....	do.	550.00	233.14	do.	49.66	Do.
.....	do.	550.00	205.15	do.	.....	Do.
.....	do.	550.00	332.46	Good	97.13	Do.
.....	do.	550.00	171.07	Very poor.	.....	Do.
.....	do.	25.00	10.24	do.	.....	Do.
.....	do.	838.00	314.28	Fair	.....	Do.
.....	do.	838.00	314.22	do.	.....	Do.
.....	do.	838.00	318.35	do.	.....	Do.
.....	do.	838.00	328.56	do.	.....	Do.
.....	do.	838.00	332.46	do.	21.04	Do.
.....	do.	838.00	313.39	do.	.....	Do.
.....	do.	838.00	312.30	do.	.....	Do.
.....	do.	838.00	330.27	do.	28.84	Do.
.....	do.	1,425.00	552.96	do.	.....	Do.
.....	do.	1,119.00	437.16	do.	.....	Do.
.....	do.	1,080.00	459.15	do.	13.82	Do.
.....	do.	1,130.00	446.81	Fair	20.91	Do.
.....	do.	1,137.00	444.39	do.	17.89	Do.
.....	Composite.	11,908.34	6,099.94	Good	.....	Do.
Muskegon, Mich.	Wood.	70.00	4.00	Bad	.....	Do.
Grafton, Ill.	Metal.	.....	.....	Fair	.....	Mississippi River, Missouri River to Minneapolis.
do.	do.	.....	.....	do.	.....	Do.
do.	do.	78.00	62.40	Good	.....	Do.
do.	do.	78.00	62.40	do.	.....	Do.
do.	do.	78.00	62.40	do.	.....	Do.
do.	do.	78.00	62.40	do.	.....	Do.
do.	do.	78.00	62.40	do.	.....	Do.
Grafton, Ill.	do.	78.00	62.40	do.	.....	Do.
do.	do.	78.00	62.40	do.	.....	Do.
do.	do.	78.00	62.40	do.	.....	Do.
Salem, Ohio.	do.	42.00	12.00	Bad	.....	Operating snag boats and dredge boats on Mississippi River.
.....	Wood.	40.10	32.10	Good	.....	Mississippi River, Missouri River to Minneapolis.
.....	do.	.....	.....	Bad	.....	Do.
.....	Metal.	.....	.....	Fair	.....	Do.
.....	do.	.....	.....	do.	.....	Do.
Grafton, Ill.	Iron.	65.00	40.00	Good	.....	Do.
St. Louis, Mo.	Wood.	202.00	24.00	Bad	.....	Operating snag boats and dredge boats on Mississippi River.
.....	do.	75.00	20.00	Fair	.....	Mississippi River, Missouri River to Minneapolis.
Grafton, Ill.	Steel.	35.00	.....	do.	.....	Do.
Stillwater, Minn.	Wood.	40.00	.....	Good	.....	Do.
Lake City, Minn.	do.	65.00	.....	Fair	.....	Do.
do.	do.	.....	.....	do.	.....	Do.
do.	do.	.....	.....	Good	.....	Do.
do.	do.	.....	.....	do.	.....	Do.
do.	do.	60.00	24.00	Fair	8.00	Do.

TABLE III.—Statement of floating plant owned by the United States Army.

ROCK ISLAND, ILL.—Continued.

Name or number.	Type.	Displacement.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
No number.....	Skiff (Lock 30).....	Long tons.	Ft. in.	Ft. in.	Ft. in.		
Do.....	Skiff (Lock 31).....	18 0	4 0	1 0	1915	Milan boat	
Do.....	Skiff (Lock 32).....	18 0	4 0	1 0	1915	do.....	
Do.....	Skiff (Apo).....	19 0	5 0	1 4	1915	do.....	
Do.....	do.....	26 0	5 4	1 6	1914	Milan boat	
Do.....	Skiff (Etna).....	20 0	5 2	1 3	1913	do.....	
Do.....	do.....	22 4	5 0	1 8	1913	do.....	
Do.....	Skiff (Geyser).....	22 4	5 0	2 2	1913	Milan boat	
Do.....	do.....	21 7	4 6	2 0	1913	Not known	
Do.....	Skiff (Mayon).....	26 0	5 6	1 4	1914	Milan boat	
Do.....	Skiff (Peleo).....	16 0	3 6	1 1	1913	do.....	
Do.....	do.....	16 0	3 6	1 1	1913	do.....	
Do.....	do.....	24 0	4 8	1 3	1913	do.....	
Do.....	Skiff (Vesuvius).....	23 4	4 6	1 6	1909	Fountain C	
Do.....	do.....	22 6	4 6	1 6	1913	do.....	
Do.....	Skiff (Taal).....	21 9	4 8	1 5	1916	do.....	
Do.....	do.....	18 0	4 0	1 5	1916	do.....	
Do.....	Skiff (Hecla).....	24 0	5 2	1 3	1913	do.....	
Do.....	do.....	24 0	5 2	1 3	1911	Milan boat	
Do.....	Skiff (Vulcan).....	26 0	5 6	1 4	1913	do.....	
Do.....	Skiff (Ajax).....	22 0	5 0	1 2	1910	do.....	
Do.....	do.....	16 0	3 10	1 1	1915	do.....	
Do.....	Skiff (Kookuk).....	22 0	4 6	1 6	1914	Moline, Ill.	
Do.....	Skiff (St. Paul).....	22 0	5 0	1 4	1910	Moline, Ill.	
Do.....	Skiff (drill boat 426).....	26 0	5 2	1 8	1913	Moline, Ill.	
Do.....	do.....	22 0	4 6	1 7	1913	Milan, Ill.	
Do.....	do.....	18 0	4 4	1 6	1913	do.....	

SAN FRANCISCO, CAL., FIRST DISTRICT.

Name or number.	Type.	Cost.	Length.	Beam.	Depth.	When.	Built.
San Pablo.....	Seagoing hopper dredge	1,100.00	163 6	35 0	17 6	1914 1910	Baltimore, Md.
Suisun.....	Gasoline launch (screw)	73.00	63 9	16 6	10 5	1913 1914	Astoria, Ore.
Clyde.....	Gasoline launch	16 0				1913	San Francisco
Suisun No. 3.....	Dinghy	16 0				1914	Oakland, Cal.
Suisun No. 1.....	Gasoline launch (screw)	16 0				1914	Mare Island
Suisun No. 2.....	Lifeboat	14 0				1914	Yard, Cal.

SAN FRANCISCO, CAL., THIRD DISTRICT.

Name or number.	Type.	Cost.	Length.	Beam.	Depth.	When.	Built.
Rio Vista.....	Motor dredge tender	45.50	60 0	18 0	7 6	1913	Sacramento
Selzer.....	Stern-wheel snag boat	240.00	157 7	35 0	4 8	1891	Stockton, Cal.
Sacramento.....	Hydraulic pipe-line dredge	984.00	150 0	40 0	11 6	1913	Baltimore, Md. Pittsburg
San Joaquin.....	do.....	984.00	150 0	40 0	11 6	1913	do.....

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

ROCK ISLAND, ILL.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	\$40.00	\$24.00	Good.		Illinois and Mississippi Canal.
		do.	40.00	24.00	do.		Do.
		do.	40.00	24.00	do.		Do.
1912	Grafton, Ill.	Steel.	50.00	24.00	do.		Mississippi River, Missouri River to Minneapolis.
		Wood.	75.00	46.00	do.		Do.
1912	Grafton, Ill.	Steel.			Fair.		Do.
1912	do.	Wood.			Good.		Do.
		do.		24.00	Fair.		Do.
		do.		24.00	do.		Do.
		do.	75.00	46.00	Good.		Do.
1913	Stillwater, Minn.	do.	36.00	21.70	Fair.	\$2.87	Do.
1913	do.	do.	33.50	28.80	Good.	8.00	Do.
1915	do.	do.	48.00	38.40	do.	8.00	Do.
		do.	61.74	32.00	do.		Do.
		do.	60.00	35.20	do.		Do.
		do.	61.50	49.40	do.		Do.
		do.	61.50	49.40	do.		Do.
1911	Grafton, Ill.	Steel.	75.00	48.00	do.	10.00	Do.
		Wood.	75.00	48.00	do.	10.00	Do.
		do.	75.00	40.00	Fair.	8.00	Do.
		do.	70.00	59.00	do.	10.00	Do.
		Metal.	70.00	54.00	do.	10.00	Do.
		Wood.	70.00	40.00	Good.		Do.
		do.	70.00	25.00	Fair.	30.00	Do.
		do.	90.00	64.00	Good.	20.00	Do.
		do.	70.00	60.80	do.	20.00	Do.
		do.	70.00	57.60	do.	20.00	Do.

SAN FRANCISCO, CAL., FIRST DISTRICT.

		Steel.	\$340,000.00	\$300,000.00	{ First class.	\$4,220.30	{ Project for keeping open channel across Pinole Shoal, San Pablo Bay, Cal.
		Wood.	35,000.00	35,000.00	do.	2,861.12	
		do.					
		do.	192.50		First class.		Used as lifeboat on cruiser Suisun.
		do.	73.00		do.		Used on surveys and inspecting dredging, Oakland Harbor, Cal.
		do.	840.00		do.	50.00	Do.
		do.	77.40		do.		Used as lifeboat on cruiser Suisun.

SAN FRANCISCO, CAL., THIRD DISTRICT.

		Wood.	\$9,200.00	\$8,000.00	Good.	\$411.55	General project for alleviation of debris and improvement of navigation in Sacramento and Feather Rivers, Cal.
		do.	35,000.00	7,500.00	Poor.	1,384.57	Improving Sacramento and Feather Rivers, Cal. (general improvement); San Joaquin River, Cal. (maintenance).
		Steel.	176,800.00	140,000.00	Good.	9,216.06	General project for alleviation of debris and improvement of navigation in Sacramento and Feather Rivers, Cal.
		do.	176,800.00	140,000.00	do.	10,654.90	Do.

TABLE III.—Statement of floating plant owned by the United States
SAN FRANCISCO, CAL., THIRD DISTRICT—Continued.

Name or number.	Type.	Dis- place- ment.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
Tackle.....	Pile driver.....	Long tons. 88.00	<i>Ft.in.</i> 64 0	<i>Ft.in.</i> 28 0	<i>Ft.in.</i> 3 6	1907	Oakland, Cal.

SAVANNAH, GA.

Cumberland.....	Seagoing hopper dredge.	1,935.00	200 0	41 0	23 6	1932	Belfast, Me...
Savannah.....	.....do.....	1,441.00	177 0	38 0	19 0	1934	Sparrows Point
Morgan.....	Self-propelling hydraulic pipe-line dredge.	767.00	134 6	38 0	8 0	1937	Baltimore, Md.
Creighton.....	Hydraulic pipe-line dredge.	221.00	80 0	30 0	6 0	1915	Charleston, S.
Macon.....	.....do.....	120.00	74 0	28 0	4 6	1911	Jacksonville, Fl.
Augusta.....	.....do.....	140.30	74 0	28 0	4 0	1911	.....do.....
Tugaloo.....	Stern-wheel snag boat...	384.00	129 3	34 0	5 6	1932	Savannah, Ga.
Oconee.....	.....do.....	136.00	126 0	28 0	4 6	1897	Macon, Ga....
Snag boat No. 1.....	Nonpropelling snag boat.	35.00	54 0	18 0	4 0	1914	Waycross, Ga.
Sapelo.....	Derrick boat.....	100.00	85 4	39 8	5 5	1894	Savannah, Ga.
Angler.....	Steam launch.....	95.00	91 0	17 2	10 0	1936	Charleston, S.
Gibbon.....	Steam tug.....	124.00	73 6	19 0	9 0	1897	.....do.....
Gem ¹	Steam survey boat.....	10.90	45 2	9 3	4 6	1891	Savannah, Ga.
Brunswick.....	Kerosene launch.....	43.50	60 0	15 0	6 0	1915	Charleston, S.
Spray.....	.....do.....	12.50	45 6	11 0	7 6	1938	Morris Heights
Seneca ⁴.....	.....do.....	7.30	40 0	8 0	2 9	1891	New York, N.
Amelia.....	Gasoline launch.....	4.80	35 0	9 0	5 9	1901	Long Island, N.
Cosine.....	.....do.....	4.00	25 0	6 6	2 6	1903	Baltimore, Md.
Cockspur.....	.....do.....	1.40	20 0	6 0	2 9	1914	Jacksonville, Fl.
Pulaski.....	.....do.....	2.08	22 0	7 0	2 9	1911	.....do.....
Uchee.....	.....do.....	1.50	24 0	5 11	2 4	1914	.....do.....
No. 1 ²	Pile driver.....	14.00	44 6	16 8	3 6	1910	Macon, Ga....

¹ \$23,421.92 to be added to contract price for sheathing bottom with copper.² New hull built 1908 and machinery overhauled in 1910.³ New hull built 1908 and new machinery installed 1913.⁴ New hull and house built in 1901, new machinery 1907-1910.

loyed in the Engineer Department at large on Dec. 31, 1916—Continued.

SAN FRANCISCO, CAL., THIRD DISTRICT—Continued.

Purchased.						
Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
.....	Wood.	\$6,525.02	\$1,800.00	Fair...	\$670.42	Improving Sacramento and Feather Rivers, Cal. (general improvement), and general project for alleviation of debris and improvement of navigation in Sacramento and Feather Rivers, Cal.

SAVANNAH, GA.

.....	Wood.	\$144,750.00	\$95,000.00	Good	\$4,158.87	Improving Savannah Harbor.
.....	Steel	175,500.00	71,000.00	do...	3,320.90	Do.
.....	do...	119,076.21	115,000.00	do...	20,392.81	Do.
.....	do...	39,389.86	37,000.00	do...	3,662.97	Improving waterway, Savannah, Ga., to Fernandina, Fla., and St. Marys River.
.....	do...	17,875.00	15,000.00	do...	93.26	Improving Altamaha River system.
.....	do...	17,875.00	17,500.00	do...	2,608.71	Improving Savannah Harbor, Savannah River below Augusta, Ga., and channel Beaufort, S. C., to Savannah, Ga.
.....	Composite.	25,000.00	12,000.00	do...	114.57	Improving Savannah River below Augusta, Ga.
Brunswick, Ga.	Wood.	3,750.00	5,500.00	do...	2.56	Improving Altamaha River system.
.....	do...	2,380.25	1,250.00	Fair	.....	Improving Ocmulgee, Satilla, and St. Marys Rivers.
.....	do...	12,000.00	2,000.00	do...	56.48	Improving Altamaha and Ocmulgee Rivers.
Charleston, S. C.	do...	12,000.00	8,000.00	Good	1,271.27	Improving Savannah Harbor.
.....	do...	Unknown.	9,000.00	do...	2,261.66	Do.
.....	do...	4,000.00	3,000.00	do...	914.02	Do.
.....	Steel	13,701.70	12,000.00	do...	892.25	Improving waterway, Savannah, Ga., to Fernandina, Fla.
New York, N. Y.	Wood.	4,800.00	3,500.00	do...	298.63	Improving Savannah Harbor and Brunswick Harbor.
New York, N. Y.	do...	1,500.00	1,200.00	Poor..	429.13	Improving Savannah Harbor, Savannah River below Augusta.
Long Island, N. Y.	do...	2,500.00	1,500.00	Good..	1,019.41	Improving Harbor at Brunswick, Ga., and Fernandina, Fla.
Baltimore, Md.	do...	350.00	200.00	do...	27.63	Improving Brunswick Harbor.
Jacksonville, Fla.	do...	399.00	250.00	do...	.....	Improving Savannah Harbor.
do...	do...	550.00	450.00	do...	.....	Do.
Brunswick, Ga.	Steel..	381.00	300.00	do...	61.30	Improving Savannah River at and below Augusta, Ga.
.....	Wood.	1,500.00	1,000.00	Fair...	.....	Improving Altamaha River system.

* Rebuilt in 1911-12.

* Old Gem remodeled and motor out of Skidaway installed.

* Hull rebuilt 1915.

TABLE III.—Statement of floating plant owned by the United States Army.

SAVANNAH, GA.—Continued.

Name or number.	Type.	Displacement.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
		<i>Long tons.</i>	<i>ft. in.</i>	<i>ft. in.</i>	<i>ft. in.</i>		Where.
Material T. B.	Material-testing barge...	38.00	45 0	20 0	4 8	1914	Savannah, Ga.
No. 1.	Deck lighter.....	30.00	56 0	15 4	3 0	1910	Macon, Ga.
No. 2.	do.....	30.00	65 0	20 0	4 6	1915	Doctortown, Ga.
No. 3.	do.....	34.00	45 0	20 0	3 11	1913	Savannah, Ga.
No. 4.	do.....	30.00	65 0	20 0	4 6	1915	Doctortown, Ga.
No. 1.	Coal lighter.....	64.00	80 6	22 0	7 6	1908	Savannah, Ga.
No. 2.	do.....	19.60	47 0	16 0	4 0	1915	Charleston, S. C.
No. 3.	do.....	52.45	65 0	22 0	6 0	1915	do.....
No. 2.	Derrick lighter.....	7.00	24 0	14 0	3 8	1915	Savannah, Ga.
No. 3 ¹	do.....	43.34	65 0	22 0	5 0	1915	Charleston, S. C.
No. 1 ²	Quarter boat.....	27.00	51 6	11 0	4 0	1907	Brunswick, Ga.
No. 2.	do.....	29.00	82 0	12 0	7 6	1914	Savannah, Ga.
No. 3.	do.....	30.00	56 0	15 4	3 0	1910	Macon, Ga.
No. 4.	do.....	15.00	51 0	13 0	4 0	1913	Brunswick, Ga.
No. 5.	do.....	20.00	41 0	16 0	3 10	1914	Augusta, Ga.
No. 6 ³	do.....	42.00	60 0	20 0	8 0	1908	Savannah, Ga.

SEATTLE, WASH.

Swinomish.....	Snag boat, combination with dredge bucket.	275.60	138 0	32 0	5 6	1914	Winslow, W.
Wilson.....	Steam tug.....	106.00	94 0	19 4	11 0	1899	Detroit, Mich.
Columbia River No. 1.	Drill scow.....	100.00	100 0	26 0	4 6	1911	Wenatchee, W.
Columbia River No. 2.	do.....	100.00	100 0	26 6	4 6	1911	do.....
Columbia River No. 3.	do.....	100.00	100 0	26 6	4 6	1911	do.....
Kettle Falls.....	Paddle-wheel gas launch.	18.00	50 0	12 0	.....	1913	Puget Sound, Wash.
No. 1.....	Deck scow.....	100 0	32 0	8 9	.....	1890	Seattle, Wash.
No. 2.....	do.....	100 0	32 0	8 9	.....	1899	do.....
(No name).....	do.....	80 0	20 0	8 0	.....	.....	Unknown.....
Orcas.....	Gasoline launch (screw).	45.00	70 6	14 0	3 7	1913	Winslow, W.
Scow No. 3.....	Deck scow.....	100 0	32 0	8 9	.....	1913	Port Blakely, W.
Scow No. 4.....	do.....	100 0	32 0	8 9	.....	1913	do.....
Scow No. 5.....	do.....	100 0	32 0	8 9	.....	.....	do.....
Scow No. 6.....	do.....	100 0	32 0	8 9	.....	.....	do.....

¹ New hoisting engine bought and installed December, 1915.² Hull of Skidway converted into houseboat.

FLOATING PLANT.

8949

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

SAVANNAH, GA.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	\$2,666.00	\$1,800.00	Good..	\$267.51	Improving Savannah Harbor.
		do.	600.00	300.00	Fair..		Improving Altamaha and Ocmulgee Rivers.
		do.	1,359.73	1,000.00	Good..		Improving Altamaha River system.
		do.	520.00	400.00	do.	186.02	Improving Savannah Harbor.
		do.	1,359.74	1,000.00	do.		Improving Altamaha River system.
		do.	2,000.00	2,000.00	do.	1,187.54	Improving waterway, Savannah, Ga., to Fernandina, Fla., and St. Marys River.
		Steel..	2,870.00	2,000.00	do.	83.92	Do.
		do.	4,742.00	4,800.00	do.	265.66	Improving Savannah Harbor.
		Wood.	200.00	200.00	do.	8.65	Improving waterway, Savannah, Ga., to Fernandina, Fla., and St. Marys River.
		Steel..	4,506.00	5,800.00	do.	1,046.83	Improving Savannah Harbor.
		Wood.	1,400.00	25.00	Poor..		Do.
		do.	800.00	200.00	do.		Do.
		do.	600.00	300.00	do.	20.74	Improving Altamaha River system.
		do.	597.00	250.00	Fair..		Improving Brunswick Harbor.
		do.	919.00	350.00	do.		Improving Savannah Harbor.
		do.	1,800.00	800.00	Good..	854.36	Do.

SEATTLE, WASH.

		Wood.	\$48,225.00	\$46,225.00	Good..	\$304.45	Improving Puget Sound, Wash.
		Steel..	37,000.00	30,000.00	do.	3,895.07	River and harbor and fortification work.
		Wood.	12,000.00	8,000.00	do.		Improving Columbia River and Kettle Falls.
		do.	12,000.00	8,000.00	do.	182.53	Do.
		do.	12,000.00	8,000.00	do.		Do.
		do.	8,800.00	6,800.00	do.		Do.
		do.	2,970.00	1,800.00	Fair..		Gun and mortar batteries.
		do.	2,970.00	1,800.00	do.		Do.
		do.	750.00	750.00	do.		Improving Grays Harbor, Wash.
		do.	29,500.00	29,500.00	Good..	357.30	River and harbor works.
		do.	4,488.00	3,000.00	do.		Improving waterway connecting Puget Sound with Lakes Union and Washington (entrance to Salween Bay).
		do.	4,438.00	3,000.00	do.		Do.
1913	Seattle, Wash.	do.	4,450.00	3,000.00	do.		Do.
1913	do.	do.	4,458.00	3,000.00	do.		Do.

* Derrick lighter No. 1 converted into houseboat No. 6 in 1915.

TABLE III.—Statement of floating plant owned by the United States Army.

ST. LOUIS, MO.

Name or number.	Type.	Displacement.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
		Long tons.	Ft. in.	Ft. in.	Ft. in.		
Selma ¹	Hydraulic pipe-line dredge.	600.00	160 0	40 0	6 0	1898	Jeffersonville
Thebes ²	do.....	600.00	160 0	40 0	6 0	1898	do.....
Fort Gage ³	do.....	815.00	197 0	45 0	7 6	1908	Dubuque, Mo.
Fort Chartres ⁴	do.....	815.00	197 0	45 0	7 6	1908	do.....
Phoenix ⁵	Dipper dredge.	2'0 00	80 0	30 0	8 0	1909	Milan, Ill.
Vulcan ⁶	do.....	2'0 00	80 0	30 0	8 0	1893	Davenport, Ia.
J. N. Macomb.....	Snag boat.	1,160.00	177 6	62 0	8 0	1874	Cincinnati, O.
H. G. Wright.....	do.....	1,200.00	190 6	62 0	8 0	1880	St. Louis, Mo.
Gen. J. H. Simpson..	Towboat.....	525.00	196 0	32 0	5 0	1895	Jeffersonville
Wm. R. King.....	do.....	716.00	218 10	41 0	5 3	1899	do.....
Isle de Bois ⁷	Steam tender.....	50.00	84 8	18 6	3 6	1894	do.....
Aux Vases ⁸	do.....	50.00	84 8	18 6	3 6	1894	do.....
Salvini ⁹	do.....	150.00	118 3	25 0	4 3	1900	do.....
Kaskaskia ⁹	do.....	150.00	118 3	25 0	4 3	1900	do.....
Meramec ¹⁰	do.....	150.00	118 3	25 0	4 3	1900	do.....
Birch.....	Gasoline launch (screw).	1.50	28 0	6 6	2 6	1909	Grafton, N. H.
Stewart.....	do.....	1.50	28 0	6 6	2 6	1909	do.....
No. 1.....	Pile driver.....	75.00	68 0	20 0	3 1	1894	Cincinnati, O.
No. 3.....	do.....	75.00	68 0	20 0	3 1	1894	do.....
No. 5.....	do.....	75.00	68 0	20 0	3 1	1894	do.....
No. 26.....	do.....	75.00	68 0	20 0	3 1	1893	St. Louis, Mo.
No. 28.....	do.....	75.00	68 0	20 0	3 1	1893	do.....
No. 29.....	do.....	75.00	68 0	20 0	3 1	1893	do.....
No. 30.....	do.....	75.00	68 0	20 0	3 1	1893	do.....
No. 31.....	do.....	75.00	68 0	20 0	3 1	1893	do.....
No. 32.....	do.....	75.00	68 0	20 0	3 1	1893	do.....
No. 33.....	do.....	75.00	68 0	20 0	3 1	1893	do.....
No. 35.....	do.....	75.00	68 0	20 0	3 1	1893	do.....
No. 101.....	do.....	109.00	88 0	25 0	4 6	1913	Ambridge, Pa.
No. 102.....	do.....	109.00	88 0	25 0	4 6	1913	do.....
No. 103.....	do.....	109.00	88 0	25 0	4 6	1913	do.....
No. 104.....	do.....	108.00	88 0	25 0	4 6	1913	do.....
No. 101.....	Grader and derrick boat.	128.00	88 0	25 0	4 6	1913	do.....
No. 102.....	do.....	128.00	88 0	25 0	4 6	1913	do.....
No. 1.....	Derrick boat.....	75.00	68 0	20 0	3 1	1893	St. Louis, Mo.
No. 2.....	do.....	75.00	68 0	20 0	3 1	1893	do.....
No. 1.....	Quarter boat.....	130.00	135 0	32 0	3 11	1893	Cincinnati, O.
No. 4.....	do.....	130.00	135 0	32 0	3 11	1893	do.....
No. 7.....	do.....	130.00	135 0	32 0	3 11	1893	Jeffersonville
No. 8.....	do.....	130.00	135 0	32 0	3 11	1893	do.....
No. 9.....	do.....	130.00	135 0	32 0	3 11	1893	do.....
No. 10.....	do.....	130.00	135 0	32 0	3 11	1893	do.....
No. 1.....	Office and survey boat..	115.00	135 0	28 0	3 11	1893	Dubuque, Mo.
No. 2.....	do.....	115.00	135 0	28 0	3 6	1893	do.....
No. 3.....	do.....	115.00	135 0	28 0	3 6	1893	do.....
No. 4.....	do.....	115.00	135 0	28 0	3 6	1893	Jeffersonville
No. 5.....	do.....	70.00	120 0	24 0	3 6	1893	Gasconade, Mo.
No. 117.....	do.....				3 6		
No. 118.....	Barge, model.....	425.00	135 0	28 0	5 0	1893	Paducah, Ky.
No. 119.....	do.....				5 0		
No. 127.....	do.....				5 0		
No. 129.....	do.....	425.00	135 0	28 0		1894	Madison, Ky.
No. 130.....	do.....						

¹ Formerly No. 3.² Formerly No. 4.³ Formerly No. 5.⁴ Formerly No. 6.⁵ Purchased from Rock Island (Ill.) district November, 1911.⁶ Formerly No. 6.

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

ST. LOUIS, MO.

Purchased:		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Steel	\$117,151.06	\$52,500.00	Good	\$3,419.42	Mississippi River between mouths of Ohio and Missouri Rivers.
		do.	114,574.95	49,500.00	do.	2,799.24	Do.
		do.	177,978.98	114,500.00	do.	4,584.94	Do.
		do.	176,796.56	112,500.00	do.	3,729.35	Do.
		Wood	19,525.00	1,000.00	Fair	683.72	Do.
		do.	19,450.00	1,000.00	do.	80.00	Do.
		Steel	240,000.00	62,000.00	Good	362.52	Removing obstructions in Mississippi, Atchafalaya, and Old Rivers.
		do.	190,000.00	59,000.00	do.	561.50	Do.
		Wood	40,000.00	6,500.00	Poor	721.20	Mississippi River between mouths of Ohio and Missouri Rivers.
		Steel	72,000.00	41,000.00	Good	2,301.56	Do.
		Wood	4,400.00	830.00	Very poor	242.84	Do.
		do.	4,400.00	830.00	do.	132.29	Do.
		Steel	19,279.50	7,250.00	Good	1,414.75	Do.
		do.	19,279.50	7,251.00	do.	669.30	Do.
		do.	19,279.50	8,153.00	do.	1,664.97	Do.
		do.	519.00	325.00	do.	19.85	Removing obstructions in Mississippi, Atchafalaya, and Old Rivers.
		do.	519.00	325.00	do.		Do.
		Wood	4,500.00	1,700.00	Fair	64.28	Mississippi River between mouths of Ohio and Missouri Rivers.
		do.	4,500.00	1,700.00	do.	69.72	Do.
		do.	4,500.00	1,700.00	do.		Do.
		do.	3,590.00	1,700.00	do.	14.61	Do.
		do.	3,590.00	1,700.00	do.	139.77	Do.
		do.	3,590.00	1,700.00	do.	1.41	Do.
		do.	3,590.00	1,700.00	do.	1.42	Do.
		do.	3,590.00	1,700.00	do.	1.41	Do.
		do.	3,590.00	1,700.00	do.	1.42	Do.
		do.	3,590.00	1,700.00	do.	1.41	Do.
		do.	3,590.00	1,700.00	do.	1.41	Do.
		Steel	8,722.44	6,800.00	Good	256.31	Do.
		do.	8,722.44	6,800.00	do.	255.83	Do.
		do.	8,722.44	6,800.00	do.	352.73	Do.
		do.	8,722.44	6,800.00	do.	263.97	Do.
		do.	13,680.02	10,800.00	do.	384.13	Do.
		do.	13,680.02	10,800.00	do.	217.17	Do.
		Wood	4,000.00	1,700.00	Fair		Do.
		do.	4,000.00	1,700.00	do.		Do.
		do.	5,200.00	2,000.00	Good	1.76	Do.
		do.	5,200.00	2,000.00	do.	1.75	Do.
		do.	5,390.00	500.00	Very poor		Do.
		do.	5,390.00	2,000.00	Good	3.45	Do.
		do.	5,390.00	2,000.00	do.	28.61	Do.
		do.	5,390.00	2,000.00	do.	47.34	Do.
		do.	4,400.00	480.00	Very poor		Do.
		do.	4,400.00	1,840.00	Good	19.79	Do.
		do.	4,400.00	1,840.00	do.	3.66	Do.
		do.	4,340.00	1,840.00	do.	3.72	Do.
		do.	2,000.00	2,300.00	do.	3.74	Do.
		do.		50.00	Very poor	8.57	Do.
		do.	118,700.00	50.00	do.	38.09	Do.
		do.		50.00	Poor	8.40	Do.
		do.		50.00	do.	8.42	Do.
		do.	118,590.00	50.00	do.	11.77	Do.
		do.		50.00	do.	8.61	Do.

¹ Formerly No. 7.

² Formerly No. 8.

³ Formerly No. 9.

⁴ Formerly No. 10.

⁵ Eh.

TABLE III.—Statement of floating plant owned by the United States Army.

ST. LOUIS, MO.—Continued.

Name or number.	Type.	Displacement.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
No. 136.....	Barge, model.....	Long tons. 425.00	Ft. in. 135 0	28 0	5 0	1894	Jeffersonville, Ind.
No. 205.....	Barge, model (store boat)	425.00	135 0	28 0	5 0	1894	Madison, Ind.
No. 209.....							
No. 213.....	Barge, model.....	425.00	135 0	28 0	5 0	1894	Cincinnati, O.
No. 218.....	Barge, flat.....	240.00	100 0	24 0	5 4	1893	Gasconade, Mo.
No. 4.....	Barge.....	650.00	152 0	34 0	6 0	1911	Ambridge, Pa.
No. 1.....							
No. 2.....							
No. 3.....							
No. 4.....							
No. 5.....							
No. 6.....							
No. 7.....							
No. 8.....	do.....	650.00	152 0	34 0	6 0	1911	do.....
No. 9.....							
No. 10.....							
No. 11.....							
No. 12.....							
No. 13.....							
No. 14.....							
No. 15.....							
No. 16.....							
No. 17.....							
No. 18.....							
No. 19.....							
No. 20.....	do.....	650.00	152 0	34 0	6 0	1911	do.....
No. 21.....							
No. 22.....							
No. 23.....							
No. 24.....							
No. 25.....							
No. 1.....	Machine shop boat.....	75.00	68 0	20 0	3 1	1909	St. Louis, Mo.
No. 116.....							
No. 117.....							
No. 118.....							
No. 119.....							
No. 120.....							
No. 121.....							
No. 122.....							
No. 123.....							
No. 124.....							
No. 125.....							
No. 126.....							
No. 127.....							
No. 128.....							
No. 129.....							
No. 130.....	Flat.....	25.00	40 0	16 0	2 6	1900	Leavenworth, Mo.
No. 131.....							
No. 132.....							
No. 133.....							
No. 134.....							
No. 135.....							
No. 136.....							
No. 137.....							
No. 138.....							
No. 139.....							
No. 140.....							
No. 141.....							
No. 142.....							
No. 143.....							
No. 144.....							
No. 145.....							

1 Each.

NOTE.—Model barges Nos. 114, 116, 121, 126 sold April, 1916. Model barges Nos. 122, 126, 128, 134, 135, 137, 212, 214, 216, 217, and quarter boats Nos. 2, 3, 5, and 6 sold to Memphis (Tenn.) district, 1916.

FLOATING PLANT.

3953

ed in the Engineer Department at large on Dec. 31, 1916—Continued.

ST. LOUIS, MO.—Continued.

Purchased.					Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Where.	Material.	First cost.	Estimated value.	Condition.		
.....	Wood.	\$3,650.00	\$500.00	Fair...	\$69.62	Mississippi River between mouths of Ohio and Missouri Rivers.
.....	do...	1 3,800.00	50.00	Poor..	69.23	Do.
.....	do...	1 3,800.00	50.00	Very poor.	34.29	Do.
.....	do...	1 3,597.00	50.00	do...	25.35	Do.
Gasconade, Mo.	do..	200.00	50.00	Poor..	8.61	Do.
.....	do..	100.00	100.00	do..	9.09	Do.
.....	Steel..	12,016.56	8,340.00	Good..	8.43	Do.
.....					23.86	
.....					22.34	
.....					152.74	
.....					180.80	
.....					8.32	
.....					1.14	
.....	do..	1 11,208.92	1 8,340.00	do...	182.00	Do.
.....					187.31	
.....					4.79	
.....					14.80	
.....					24.10	
.....					7.88	
.....					8.32	
.....					205.56	
.....					30.98	
.....					31.40	
.....	do..	1 11,425.62	1 8,340.00	do...	24.33	Do.
.....					202.31	
.....					1.03	
.....					31.40	
.....	Wood.	2,201.12	90.00	Very poor.		Do.
.....	do..	1 319.00	1 40.00	Poor..	(?)	Do.

* No repairs made to wood flats during year.

—Pile drivers Nos. 25 and 34 sold to Kansas City (Mo.) district. Pile driver No. 4 sold to Memphis district. Extraordinary repairs adding to value.

TABLE III.—Statement of floating plant owned by the United States Army.

ST. LOUIS, MO.—Continued.

Name or number.	Type.	Dis- place- ment.	Dimensions.			Built.		
			Length.	Beam.	Depth.	When.	Where.	
No. 146.....	Flat.....	Long tons.	25.00	40 0	16 0	2 6	1900	Leavenworth,
No. 147.....								
No. 148.....								
No. 149.....								
No. 150.....								
No. 151.....								
No. 152.....								
No. 153.....								
No. 154.....								
No. 155.....								
No. 156.....								
No. 157.....								
No. 158.....								
No. 159.....								
No. 160.....								
No. 161.....								
No. 162.....								
No. 163.....								
No. 164.....								
No. 165.....								
No. 166.....								
No. 167.....								
No. 1.....	do.....	40.00	55 0	16 0	3 0	1903	St. Louis, Mo.	
No. 2.....								
No. 3.....								
No. 4.....								
No. 5.....								
No. 6.....								
No. 7.....								
No. 8.....								
No. 9.....								
No. 10.....								
No. 11.....								
No. 12.....								
No. 13.....								
No. 14.....								
No. 15.....								
No. 16.....								
No. 17.....								
No. 18.....								
No. 19.....								
No. 20.....								
No. 21.....								
No. 22.....								do.....	40.00	55 0	16 0	3 0	1911	Ambridge, Mo.
No. 23.....								
No. 24.....								
No. 25.....								
No. 26.....								
No. 27.....								
No. 28.....								
No. 29.....								
No. 30.....								
No. 31.....								
No. 32.....								
No. 33.....								
No. 34.....								
No. 35.....								
No. 36.....								
No. 37.....								
No. 38.....								
No. 39.....								
No. 40.....	do.....	40.00	55 0	16 0	3 0	1911	do.....	
No. 41.....								
No. 42.....								
No. 43.....								

¹ Each.² No repairs made to wood flats during year.

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

ST. LOUIS, MO.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Wood.	\$319.00	\$40.00	oor..	(²)	Mississippi River between mouths of Ohio and Missouri Rivers.
		Steel.	1 1,741.57	1 1,280.00	Good	(²)	Do.
		do.	1 1,690.65	1 990.00	do..	(²)	Do.
		Steel.	1 1,690.61	1 990.00	do...	(²)	Do.

² Sixty-three steel flats repaired during the year at a cost of \$705.46; average, \$11.20.

TABLE III.—Statement of floating plant owned by the United States and

ST. LOUIS, MO.—Continued.

Name or number.	Type.	Dis- place- ment.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
		Long tons.	Ft. in.	Ft. in.	Ft. in.		
No. 44.....	Flat.....	40.00	55 0	16 0	3 0	1911	Ambridge, Pa.....
No. 45.....							
No. 46.....							
No. 47.....							
No. 48.....							
No. 49.....							
No. 50.....							
No. 51.....							
No. 52.....							
No. 53.....							
No. 54.....	do.....	40.00	55 0	16 0	3 0	1912	do.....
No. 55.....							
No. 56.....							
No. 57.....							
No. 58.....							
No. 59.....							
No. 60.....							
No. 61.....							
No. 62.....							
No. 63.....							
No. 1.....	Yawl.....	1.00	25 0	4 8	2 6	1893	St. Joseph, Mich....
No. 21.....							
No. 22.....							
No. 23.....							
No. 24.....							
No. 25.....							
No. 26.....							
No. 63.....							
No. 64.....							
No. 65.....							
No. 66.....	Skiff.....	.75	19 9	5 3	1 4	1894	do.....
No. 67.....							
No. 68.....							
No. 69.....							
No. 70.....							
No. 71.....							
No. 72.....							
No. 73.....							
No. 74.....							
No. 75.....							
No. 76.....	do.....	.75	19 9	5 3	1 4	1894	do.....
No. 77.....							
No. 78.....							
No. 79.....							
No. 80.....							
No. 81.....							
No. 82.....							
No. 83.....							
No. 84.....							
No. 85.....							
No. 86.....	do.....	.75	19 9	5 3	1 4	1894	do.....
No. 87.....							
No. 88.....							
No. 89.....							
No. 90.....							
No. 92.....							
No. 93.....							
No. 94.....							
No. 97.....							
No. 98.....							
No. 99.....	do.....	.75	24 0	4 8	1 4	1895	do.....
No. 100.....							
No. 101.....							
No. 102.....							
No. 105.....							
No. 106.....							
No. 107.....							
No. 108.....							
No. 109.....							

¹ Each.² Sixty-three steel flats repaired during the year at a cost of \$705.46; average \$11.20.

Skiffs Nos. 60, 61, and 62 condemned April, 1916.

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

ST. LOUIS, MO.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
	Where.						
	Steel.....	Steel..	1 \$1,629.74	1 \$990.00	Good..	(2)	{ Mississippi River between Mouths of the Ohio and Missouri Rivers.
do..do..	1,652.33	1 990.00	...do..	(2)		Do.
	.....do..	Wood..	105.00	17.00	Poor..	(2)	Do.
	.....do..	.....do..	1 85.00	13.00	...do..	(2)	Do.
	.....do..	.....do..	1 30.00	1 5.00	...do..	(2)	Do.
	.....do..	.....do..	1 30.00	1 5.00	...do..	(4)	Do.
	.....do..	.....do..	1 30.00	1 5.00	...do..	(4)	Do.
	.....do..	.....do..	1 60.00	1 5.00	...do..	(4)	Do.

¹ Twenty-four skiffs repaired during the year at a cost of \$25.59; average \$1.07.

⁴ Twenty-four wood skiffs repaired during the year at a cost of \$25.59; average \$1.07.

TABLE III.—Statement of floating plant owned by the United States and

ST. LOUIS, MO.—Continued.

Name or number.	Type.	Dimensions.				Built at.				
		Dis- place- ment.	length.	Breadth.	Depth.	When.	Where.			
		Long tons.	Ft. in.	Ft. in.	Ft. in.					
No. 113.....	Skiff.....	0.75	19	8	4	6	1	3	1911	Fond du lac, Wis.....
No. 114.....										
No. 115.....										
No. 116.....										
No. 117.....										
No. 118.....										
No. 119.....										
No. 120.....										
No. 121.....										
No. 122.....										
No. 123.....										
No. 124.....										
No. 125.....										
No. 126.....										
No. 127.....										
No. 128.....	do.....	.75	19	8	4	6	1	3	1911	do.....
No. 129.....										
No. 130.....										
No. 131.....										
No. 201.....										
No. 202.....										
No. 203.....										
No. 204.....										
No. 207.....										
No. 208.....										
No. 209.....										
No. 210.....										
No. 211.....	do.....	.75	19	6	4	6	1	3	1911	Grafton, Ill.....
No. 212.....										
No. 213.....										
No. 214.....										
No. 215.....										
No. 216.....										
No. 217.....										
No. 218.....										
No. 219.....										
No. 220.....										
No. 1001.....	do.....	.75	24	8	5	6	1	11	1915	do.....

ST. LOUIS, MO. (MISSISSIPPI RIVER COMMISSION).

Beta.....	Hydraulic pipe-line dredge (nonpropelling).	1,300.00	214	0	58	0	6	11	1896	Pittsburgh, Pa.....
Gamma.....	Hydraulic pipe-line dredge (self-propelling, twin screw).	581.00	165	6	38	0	7	10	1897	Jeffersonville, Ind..
Delta.....	Hydraulic pipe-line dredge (nonpropelling).	830.00	185	6	38	0	8	4	1897	Clifton Terrace, Ill..
Epsilon.....	do.....	650.00	162	0	40	0	7	6	1898	Grafton, Ill.....
Zeta.....	do.....	650.00	162	0	40	0	7	6	1898	do.....
Iota.....	Hydraulic pipe-line dredge (self-propelling, side wheel).	800.00	192	0	44	0	7	0	1900	do.....
Kappa.....	do.....	834.00	192	0	44	0	7	0	1901	do.....
Henry Flad.....	do.....	834.00	192	0	44	0	7	0	1901	do.....
B. M. Harrod.....	do.....	1,270.00	210	0	44	0	8	6	1907	do.....
Mississippi.....	Stern-wheel steamboat..	540.00	200	11	32	0	6	0	1882	Carondelet, Mo.....

¹ Each.² Twenty-four wood skiffs repaired during the year at a cost of \$25.59; average \$1.07.³ No steel skiffs repaired during year.

oyed in the Engineer Department at large on Dec. 31, 1916—Continued.

ST. LOUIS, MO.—Continued.

Purchased.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Where.						
	Wood.	\$35.90	\$15.00	Good	(2)	Mississippi River between mouths of Ohio and Missouri Rivers.
	do...	35.90	15.00	do...	(2)	Do.
	Steel..	42.50	25.00	do...	(2)	Do.
	do...	65.00	60.00	do...	(2)	Removing obstructions in Mississippi, Atchafalaya, and Old Rivers.

ST. LOUIS, MO. (MISSISSIPPI RIVER COMMISSION).

	Steel..	\$218,782.25	\$68,300.00	Good..	\$1,457.00	Improving Mississippi River under the Mississippi River Commission, works in charge of secretary.
	do...	85,530.60	65,700.00	do...	4,242.00	Do.
	do...	124,940.00	31,000.00	do...	29.00	Do.
	do...	102,000.00	32,500.00	do...	5,396.00	Do.
	do...	109,000.00	29,300.00	do...	1,126.00	Do.
	do...	100,479.79	48,900.00	do...	2,921.00	Do.
	do...	135,400.00	67,900.00	do...	3,791.00	Do.
	do...	135,400.00	81,600.00	do...	6,935.00	Do.
	Iron steel.	238,998.17	147,800.00	do...	1,151.00	Do.
	Steel..	45,000.00	25,000.00	do...	5,742.00	Do.

built in 1898, Des Moines Rapids canal dry dock.

uper works burned Jan. 11, 1908; rebuilt at West Memphis, Ark., February, 1908, to June, 1908

uper works burned Jan. 16, 1893; rebuilt at St. Louis, Mo., 1893.

TABLE III.—Statement of floating plant owned by the United States Army, ST. LOUIS, MO. (MISSISSIPPI RIVER COMMISSION)—Continued.

Name or number.	Type.	Displacement.	Dimensions.			When.	Built.
			Length.	Breadth.	Depth.		
		Long tons.	Ft. in.	Ft. in.	Ft. in.		Where.
Sachem.....	Stern-wheel towboat.....	560.00	199 4	36 0	5 6	1899	Dubuque, Mo.
Choctaw.....	do.....	560.00	199 4	36 0	5 6	1899	do.....
Nokomis.....	do.....	560.00	199 4	36 0	5 6	1899	do.....
Leota.....	do.....	560.00	199 4	36 0	5 6	1899	do.....
Inspector, M. R. C.....	Twin-screw steamboat, "tunnel" type.	258.00	144 0	28 0	6 0	1915	Charleston, Mo.
John Ewens.....	Stern-wheel steamboat.....	162.00	136 6	21 0	4 10	1913	Jeffersonville, Mo.
Jupiter.....	do.....	120.00	118 0	20 0	4 6	1912	do.....
Saturn.....	do.....	120.00	118 0	20 0	4 6	1912	do.....
Vulcan.....	do.....	83.00	95 0	17 0	3 9	1897	Dubuque, Mo.
Mercury.....	do.....	83.00	94 6	17 0	3 9	1899	Jeffersonville, Mo.
Venus.....	do.....	83.00	94 6	17 0	3 9	1899	do.....
Mars.....	do.....	83.00	94 6	17 0	3 9	1899	do.....
Bolivar.....	Gasoline motor skiff.....	.90	25 0	5 0	1 11	1913	Grafton, Mo.
Obion.....	do.....	.90	25 0	5 0	1 11	1913	do.....
Hydrog.....	do.....	1.83	24 10	5 7	1 7	1911	St. Louis, Mo.
M. R. C. No. 1.....	do.....	.81	19 6	4 10	1 3	1909	Leavenworth, Mo.
M. R. C. No. 2.....	do.....	.81	19 6	4 10	1 3	1909	do.....
M. R. C. No. 4.....	do.....	.81	19 6	4 10	1 3	1909	do.....
M. R. C. No. 1.....	Derrick boat.....	132.00	80 0	36 0	5 0	1914	Hull, Jeffersonville, Mo.
No. 13.....	Pile sinker.....	54.00	68 0	20 0	3 6	1894	West Memphis, Ark.
No. 971.....	do.....	56.00	76 0	25 0	3 10	1897	Cincinnati, Mo.
No. 981.....	do.....	56.00	76 0	25 0	3 10	1898	do.....
No. 982.....	do.....	56.00	76 0	25 0	3 10	1898	do.....
No. 983.....	do.....	56.00	76 0	25 0	3 10	1898	do.....
Wabash No. 3.....	Quarter boat.....	53.00	102 4	22 0	3 0	1911	Terre Haute, Mo.
No. 041.....	Barge.....	35.00	80 0	20 0	4 0	1904	West Memphis, Ark.
No. 051.....	do.....	35.00	80 0	20 0	4 0	1905	do.....
No. 1.....	Pump boat.....	30.00	65 0	16 0	4 6	1905	do.....
No. 1.....	Calking flat.....		24 6	6 0	1 2	1904	do.....

ST. PAUL, MINN.

Manito.....	Orange-peel bucket revolving dredge.	307.00	106 0	44 0	7 0	1914	Cohasset, Me.
Wigwam.....	Quarter boat.....	49.00	70 0	22 0	3 3	1914	do.....
Wampum.....	Office and store boat.....	44.00	70 0	22 0	3 3	1914	do.....
Animiki.....	Tug, gasoline.....	11.00	55 0	11 10	3 9	1914	do.....
Nodin.....	Launch.....	1.00	30 3	5 3	2 8	1915	St. Paul, Minn.
Nawapon.....	Scow (gasoline tank).....	37.00	60 6	16 0	4 2	1911	Cohasset, Me.
Tigo.....	Scow (water tank).....	18.00	31 6	12 0	3 4	1914	do.....
Amik.....	Scow (coal).....	18.50	68 6	16 0	4 7	1914	do.....
Niggik.....	do.....	18.50	68 6	16 0	4 7	1914	do.....
M-1.....	Skiff.....	0.14	18 0	4 6	1 10	1914	do.....
M-2.....	do.....	0.11	16 0	4 0	1 6	1914	do.....
M-3.....	do.....	0.11	16 0	4 0	1 6	1914	do.....
M-4.....	do.....	0.09	14 0	3 10	1 4	1914	do.....
M-5.....	do.....	0.06	10 0	2 10	0 10	1912	do.....
M-6.....	do.....	0.25	19 9	5 3	1 4	(*)	Unknown.
Bequok.....	Canoe.....	0.04	17 0	2 10	1 2	1910	Veazie, Me.
Oriole.....	Snag boat.....	85.00	107 0	22 4	5 0	1908	Aitkin, Minn.

* Loaned to experimental towboat board, May 31, 1916.

* Sunk at West Memphis, Ark., Mar. 20, 1913, and rebuilt at West Memphis, Ark., 1914-15.

FLOATING PLANT.

3961

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

ST. LOUIS, MO. (MISSISSIPPI RIVER COMMISSION)—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
		Steel..	\$45,672.00	\$17,900.00	Good..	\$1,252.00	Improving Mississippi River under the Mississippi River Commission, works in charge of secretary.
		do...	45,672.00	19,400.00	do...	1,835.00	Do.
		do...	45,672.00	18,000.00	do...	9,072.00	Do.
		do...	45,672.00	18,100.00	do...	1,714.00	Do.
		do...	64,500.00	62,000.00	do...	2,443.00	Do.
		do...	23,490.00	21,200.00	do...	1,061.00	Do.
		do...	17,175.00	14,500.00	do...	1,042.00	Do.
		do...	17,175.00	14,200.00	do...	575.00	Do.
		do...	7,080.00	4,000.00	Fair..	1,145.00	Do.
		do...	7,749.00	5,400.00	do...	1,220.00	Do.
		do...	7,749.00	4,100.00	do...	1,522.00	Do.
		do...	7,749.00	6,100.00	do...	2,030.00	Do.
1913	Grafton, Ill.	Wood.	333.75	265.00	do...	1.48	Do.
1913	do.	do.	333.75	265.00	do...	16.91	Do.
1911	St. Louis, Mo.	do.	350.50	190.00	Bad..		Do.
1909	Leavenworth, Ind.	do.	263.67	180.00	Fair..		Do.
1909	do.	do.	263.67	135.00	do...	36.70	Do.
1909	do.	do.	224.50	135.00	do...		Do.
		Steel..	14,171.22	12,200.00	Good..	381.00	Do.
		Wood.	4,500.00	2,270.00	do...	460.00	Do.
		do.	2,165.00	820.00	Very bad.	253.00	Do.
		do.	* 2,384.00	1,160.00	Good..	685.00	Do.
		do.	* 2,384.00	900.00	do...	428.00	Do.
		do.	* 2,384.00	1,700.00	do...	1,224.00	Do.
1912	U. S. Engineer Office, Louisville, Ky.	do.	1,131.30	875.00	Bad..	53.00	Do.
		do.	1,205.96	340.00	Fair..	37.00	Do.
		do.	1,606.47	680.00	do...	71.00	Do.
		do.	1,456.02	760.00	do...	145.00	Do.
		do.	52.77	25.00	do...		Do.

ST. PAUL, MINN.

.....	Not purchased..	Wood.	\$41,000.00	\$34,400.00	Good..	* \$5,905.68	Mississippi and Leech Rivers, Minn.
.....	do.	do.	5,702.46	4,562.00	do...	80.70	Do.
.....	do.	do.	4,335.78	3,469.00	do...	67.33	Do.
.....	do.	do.	5,933.02	4,283.00	do...	539.12	Do.
1915	St. Paul, Minn.	do.	978.00	678.00	do...	51.14	Do.
1915	Cohasset, Minn.	do.	162.50	830.00	Fair..	74.46	Do.
.....	Not purchased..	do.	903.78	723.00	Good..	40.11	Do.
.....	do.	do.	1,120.07	840.00	do...	173.75	Do.
.....	do.	do.	1,196.09	840.00	do...	48.31	Do.
.....	do.	do.	94.09	56.00	do...	3.00	Do.
.....	do.	do.	65.00	39.00	do...	3.00	Do.
.....	do.	do.	65.00	39.00	do...	2.50	Do.
.....	do.	do.	60.00	38.00	do...	2.50	Do.
1915	Cohasset, Minn.	do.	25.00		Worth less.	2.50	Do.
(*)	Unknown.	do.	(*)	80.00	Good..	66.12	Do.
1911	Warroad, Minn.	do.	44.00	19.00	Fair..		Do.
1910	Libby, Minn.	do.	3,500.00	9,000.00	do...	* 1,270.38	Mississippi between Brainerd and Grand Rapids, Minn.

* Altered to motor skiff, West Memphis, Ark., 1910.

* Approximate.

* Under authority 92347/213 E. D.

* Unknown.

* Under authority 78021/13 E. D.

TABLE III.—Statement of floating plant owned by the United States and

ST. PAUL, MINN.—Continued.

Name or number.	Type.	Dis- place- ment.	Dimensions.			When.	Built: Where.
			Length.	Beam.	Depth.		
		Long tons.	Ft. in.	Ft. in.	Ft. in.		
O-1.....	Skiff.....	0.08	16 0	3 8	1 4	1908	St. Paul, Minn.....
O-2.....	do.....	0.08	16 0	3 10	1 4	1910	Oshkosh, Wis.....
O-3.....	do.....	0.12	17 6	4 4	1 5	1915	St. Paul, Minn.....
Warroad.....	Hydraulic pipe-line dredge.	260.00	158 0	27 0	8 6	1904	Warroad, Minn.....
6 barges.....	Pipe floats.....	14.00	24 0	10 0	2 4	1904	do.....
Barge.....	Fuel barge.....	15.00	50 0	14 0	2 11	1904	do.....
Do.....	Derrick barge.....	15.00	50 0	14 0	2 11	1904	do.....
Bull calf.....	Gasoline launch.....	1.00	23 0	6 3	3 4	1906	Roseau, Minn.....
3.....	Rowboats.....	10.08	16 0	3 8	1 4	1908	St. Paul, Minn.....
6.....	do.....	10.08	15 6	3 10	1 4	1913	Alexandria, Minn.....
1.....	Skiff.....	0.25	19 9	5 3	1 4	(*)	Unknown.....

VICKSBURG, MISS.

Waterway.....	Hydraulic pipe-line dredge (self-propell- ing).	417.00	163 0	34 0	7 0	1912	Dubuque, Iowa.....
Ben Humphreys.....	Combination snag boat and bucket dredge.	286.60	155 6	32 0	5 0	1908	Jeffersonville, Ind.....
Jos. E. Ransdell.....	Stern-wheel snag boat...	286.60	155 6	32 0	5 0	1908	do.....
Columbia.....	do.....	136.87	137 4	27 0	4 0	1877	Gainesville, Miss.....
Thos. B. Florence.....	do.....	107.00	109 6	20 0	4 0	1875	South St. Louis, Mo.....
C. W. Howell.....	do.....	304.46	166 0	36 0	5 0	1881	do.....
Ouachita.....	Gasoline launch.....	17.00	65 6	10 5	4 0	1897	Charleston, W. Va.....
Roland.....	do.....	2.00	24 4	4 10	3 4	1914	Grafton, Ill.....
Franklin.....	do.....	3.00	29 0	7 0	3 10	1914	do.....
No. 1.....	Steam derrick boat.....	105.55	95 0	32 0	3 0	1909	Vicksburg, Miss.....
No. 2.....	do.....	54.17	65 0	24 0	3 0	1910	Arkadelphia, Ark.....
No. 116.....	do.....	69.47	69 0	29 0	4 0	1907	Vicksburg, Miss.....
No. 3 ¹⁰	Quarter boat.....	34.00	68 0	18 0	3 0	1897	Camden, Ark.....
No. 5 ¹⁰	do.....	34.00	68 0	18 0	3 0	1904	Shreveport, La.....
No. 9 ¹⁰	do.....	34.00	68 0	18 0	3 0	1908	do.....
No. 10 ¹⁰	do.....	34.00	68 0	18 0	3 0	1908	Jonesville, La.....
No. 11.....	do.....	34.00	68 0	18 0	3 0	1908	Vicksburg, Miss.....
No. 9113.....	Maneuver boat.....	36.00	60 0	25 0	4 0	1911	Monroe, La.....
No. 9122.....	do.....	75.00	80 0	30 0	4 0	1912	New Orleans, La.....
No. 9123.....	Scow barge (100 tons)...	50.00	60 0	25 0	4 0	1912	do.....
No. 9127.....	Maneuver boat.....	50.00	60 0	25 0	4 0	1912	do.....
No. 9181.....	Scow barge (65 tons)...	27.80	60 0	20 0	4 0	1908	Vicksburg, Miss.....
No. 9085.....	Scow barge (120 tons)...	38.20	60 0	25 0	5 0	1908	do.....
No. 9111.....	Scow barge (200 tons)...	117.00	80 0	40 0	4 0	1911	Monroe, La.....
No. 9121.....	Scow barge (150 tons)...	75.00	80 0	30 0	4 0	1912	New Orleans, La.....

¹ Each.

² No repairs.

³ Unknown.

* Formerly No. 125676, Col. Hooker.

* Hull rebuilt at Vicksburg, Miss., 1908.

* Repaired 1885 South St. Louis, Mo., repaired 1900, Dubuque, Iowa.

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

ST. PAUL, MINN.—Continued.

When.	Purchased.		First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
	Where.	Material.					
1906	St. Paul, Minn.	Wood.	\$29.70		Worthless.		Mississippi between Brainard and Grand Rapids, Minn.
1912	Cohasset, Minn.	do.	20.00		do.		do.
1915	St. Paul, Minn.	do.	41.00	\$30.00	Good.		do.
	Not purchased.	do.	26,500.00	9,000.00	Fair.	\$133.93	Improving Warroad Harbor and River, Minn.
	do.	do.	1,170.00	180.00	do.	(2)	do.
	do.	do.	480.00	25.00	Poor.	(2)	do.
	do.	do.	450.00	25.00	do.	(2)	do.
1911	Warroad, Minn.	do.	275.00	125.00	do.	6.30	do.
1908	St. Paul, Minn.	do.	24.70	18.00	Fair.	(2)	Operating and care of canals and other works of navigation, indefinite.
1913	Alexandria, Minn.	do.	37.80	20.00	Good.	(2)	do.
(7)	Unknown.	do.	(2)		Useless	(2)	do.

VICKSBURG, MISS.

		Steel.	\$100,304.00	\$85,000.00	Good.	\$506.19	Improving Red River, La. and Ark.
		Iron and steel.	42,463.00	27,000.00	do.	478.25	Improving Yazoo River, Miss.
		do.	42,483.00	24,000.00	do.	193.73	Improving Ouachita River, Ark. and La.
1898	Shreveport, La.	Wood.	1,800.00	1,500.00	Bad.		Improving Ouachita River, Ark. and La., and Yazoo River, Miss.
1875	South St. Louis, Mo.	Iron and steel.	14,000.00	1,900.00	Fair.	499.04	Improving Red River, La. and Ark.
		do.	44,650.00	15,000.00	do.	1,094.85	do.
1903	Charleston, W. Va.	Steel.	5,490.00	2,500.00	Poor.	80.42	Improving Ouachita River, Ark. and La.
1914	Grafton, Ill.	do.	136.50	90.00	Good.	20.13	do.
1914	do.	do.	558.69	450.00	do.	7.21	do.
		Wood.	3,200.00	1,500.00	Poor.	491.48	Improving Big Sunflower River, Miss.
		do.	3,600.00	1,500.00	Bad.	325.57	Improving Ouachita River, Ark. and La.
		do.	2,100.00	1,000.00	do.	227.60	Improving Big Sunflower River, Miss.
1897	Camden, Ark.	Steel.	600.00	1,200.00	Good.		Improving Ouachita River, Ark. and La.
		do.	1,810.00	1,200.00	do.		Improving Red River, La. and Ark.
		do.	1,300.00	1,200.00	do.		do.
		do.	1,400.00	1,200.00	do.		Improving Ouachita River, Ark. and La.
		Wood.	1,500.00	250.00	Bad.		Improving Big Sunflower River, Miss.
		do.	2,300.00	2,500.00	Poor.	81.37	Improving Ouachita River, Ark. and La.
		do.	3,635.00	3,800.00	Good.		do.
		do.	2,500.00		do.		do.
		do.	2,500.00	3,000.00	do.	27.40	do.
		do.	1,200.00	80.00	do.	572.91	Improving Big Sunflower River, Miss.
		do.	1,700.00	1,500.00	do.	1,178.88	do.
		do.	3,775.00	250.00	Bad.	100.00	Improving Ouachita River, Ark. and La.
		do.	3,635.00	2,800.00	Good.	843.24	Improving Big Sunflower River, Miss.

¹ Repaired 1900, Dubuque, Iowa.
² Formerly No. 92850, Madge.

³ Formerly scow barge No. 116.
⁴ Repaired with new steel hulls, 1915.

TABLE III.—Statement of floating plant owned by the United States Army.

VICKSBURG, MISS.—Continued.

Name or number.	Type.	Displacement.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
		Long tons.	Ft. in.	Ft. in.	Ft. in.		
No. 9112.....	Catamaran barge.....	71.00	60 0	30 0	4 0	1911	New Orleans
No. 9124.....	Scow barge (175 tons)...	65.00	100 0	28 0	5 0	1912	do.....
No. 9125.....	Scow barge (175 tons)...	65.00	100 0	28 0	5 0	1912	do.....
No. 9126.....	Scow barge (50 tons)....	32.00	50 0	25 0	4 0	1912	do.....
No. 9083.....	Scow barge (120 tons)...	40.30	60 0	25 0	5 0	1908	Vicksburg, M
No. 9123.....	Maneuver boat.....	75.00	80 0	30 0	4 0	1912	New Orleans

VICKSBURG, MISS. (THIRD MISSISSIPPI RIVER.)

Parker.....	Screw-propelled steam tug.....	98.00	69 9	16 4	7 2	1885	St. Louis, Mo
Boas.....	do.....	73.50	65 0	16 3	7 0	1871	Pittsburgh, Pa
White Water.....	do.....	145.00	83 0	19 0	9 0	1875	Camden, N. C.
Sydney C.....	do.....	96.00	69 5	15 3	7 10	1907	New Orleans
Control ¹	Stern-wheel steamboat..	232.90	157 0	29 0	4 0	1905	Jeffersonville
H. St. L. Coppee.....	do.....	350.45	166 0	30 0	6 0	1904	do.....
Arthur Hider.....	do.....	350.45	163 0	30 0	6 0	1898	do.....
Issaquena.....	do.....	362.60	171 0	30 0	6 0	1913	do.....
Chicot.....	Gasoline screw-propelled launch.....	4.20	35 5	6 6	3 3	1913	Grafton, Ill.
Carroll.....	do.....	15.00	51 5	11 5	4 0	1912	Rosedale, Mo
1015.....	Floating dry dock.....	384.20	158 8	54 6	4 9	1910	Ambridge, Pa
222.....	Machine-shop boat.....	181.00	120 0	30 0	6 0	1883	Not known.
1011.....	Steam hydraulic grader..	229.46	120 0	30 0	6 0	1910	Ambridge, Pa
1012.....	do.....	229.46	120 0	30 0	6 0	1910	do.....
1013.....	do.....	222.40	120 0	30 0	6 0	1910	do.....
079.....	Carpenter-shop boat.....	170.00	120 0	30 0	6 0	1907	Levanua, Oh
579.....	Steam derrick boat.....	170.00	120 0	30 0	6 0	1904	do.....
071 ⁴	do.....	170.00	120 0	30 0	6 0	1907	do.....
1109.....	do.....	45.10	96 0	24 0	5 0	1911	Memphis, Tenn
1311.....	do.....	66.90	100 0	24 0	5 0	1913	do.....
1503.....	do.....	150.00	120 0	30 0	7 0	1915	Vicksburg, Mo
1504.....	do.....	150.00	120 0	30 0	7 0	1915	do.....
083 ⁴	Concrete-mixing plant..	180.00	120 0	30 0	6 0	1908	Levanua, Oh
086 ⁴	do.....	180.00	120 0	30 0	6 0	1908	do.....
072 ⁴	do.....	200.00	120 0	30 0	6 0	1907	do.....
1509 ⁴	do.....	200.00	120 0	30 0	7 0	1915	Vicksburg, Mo
131.....	Quarter boat.....	186.00	131 0	30 0	5 0	1881	Stillwater, Mo
155.....	do.....	107.00	120 0	28 0	6 0	1883	Not known.
156.....	do.....	107.00	120 0	28 0	6 0	1883	do.....
167.....	do.....	107.00	120 0	28 0	6 0	1883	do.....
159.....	do.....	107.00	120 0	30 0	6 0	1883	do.....
1010.....	do.....	177.00	135 0	34 0	5 0	1910	Keokuk, Iowa
1107.....	do.....	177.00	140 0	34 0	5 0	1911	New Orleans
1108.....	do.....	177.00	140 0	34 0	5 0	1911	do.....
1201.....	do.....	177.00	140 0	34 0	5 0	1912	do.....
1202.....	do.....	177.00	140 0	34 0	5 0	1912	do.....
1307.....	do.....	177.00	140 0	34 0	5 0	1913	do.....
1308.....	do.....	177.00	140 0	34 0	5 0	1913	do.....
1513.....	do.....	177.80	86 0	32 0	4 9	1915	Vicksburg, Mo
1607.....	do.....	41.20	62 0	18 0	3 6	1916	do.....
075.....	Matress boat.....	119.00	140 0	34 0	6 0	1907	New Orleans
076.....	do.....	119.00	140 0	34 0	6 0	1907	do.....
089.....	do.....	119.00	135 0	34 0	5 0	1908	do.....
0810.....	do.....	119.00	135 0	34 0	5 0	1908	do.....
1134.....	do.....	119.00	134 0	34 0	5 0	1911	do.....
1135.....	do.....	119.00	134 0	34 0	5 0	1911	do.....
1136.....	do.....	119.00	134 0	34 0	5 0	1911	Gulfport, Miss
1137.....	do.....	119.00	134 0	34 0	5 0	1911	do.....
1608.....	Matress boat (concrete mats).....	340.00	160 0	45 0	10 0	1916	Vicksburg, Mo
111.....	Scow barge (30 tons)....	15.00	60 0	15 0	3 0	1884	Not known.
112.....	do.....	15.00	60 0	15 0	3 0	1884	do.....
594.....	Scow barge (400 tons)...	80.00	120 0	30 0	6 0	1894	Levanua, Oh
568.....	do.....	80.00	120 0	30 0	6 0	1900	do.....

¹ Formerly Scimitar II.² Not known.

ed in the Engineer Department at large on Dec. 31, 1916—Continued.

VICKSBURG, MISS.—Continued.

Purchased.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Where.						
.....	Wood.	\$2,050.00	\$150.00	Bad...		Improving Ouachita River, Ark. and La.
.....	do...	3,700.00	1,000.00	Fair...		Do.
.....	do...	3,700.00	1,000.00	do...		Improving Ouachita River, Ark. and La.
.....	do...	2,600.00	700.00	do...		Do.
.....	do...	1,700.00	400.00	Poor...		Improving Big Sunflower River, Miss.
.....	do...	5,713.00	3,900.00	Fair...	\$827.72	Do.

VICKSBURG, MISS. (THIRD MISSISSIPPI RIVER.)

St. Louis, Mo...	Wood.	\$6,500.00	\$750.00	Bad...	\$176.15	
New Orleans, La	Iron...	10,000.00	11,000.00	Good..	431.74	
do	do	15,000.00	16,500.00	do	679.74	
Greenville, Miss	Steel	7,730.00	10,000.00	do	1,310.22	
Paducah, Ky	Wood	12,000.00	7,500.00	Fair...	5,566.51	
do	Steel	53,900.00	31,000.00	Good..	4,534.16	
do	do	37,450.00	27,000.00	do	1,510.97	
do	do	62,640.00	52,000.00	do	1,237.19	
do	do	1,877.75	1,400.00	do	228.40	
Lake Providence, La.	Wood.	2,400.00	3,500.00	do	102.84	
do	Steel	39,000.00	30,000.00	do		
do	Wood	(?)	15,000.00	Fair...	1,434.24	
do	Steel	31,288.00	25,000.00	Good..	953.96	
do	do	31,592.00	25,000.00	do	503.09	
do	do	25,000.00	23,000.00	do	742.25	
do	Wood	6,019.00	7,000.00	Fair...	235.03	
do	do	5,500.00	4,000.00	do	307.55	
do	do	7,000.00	7,000.00	Good..		
Memphis, Tenn	do	2,250.00	2,000.00	Fair...	210.10	
do	do	2,750.00	2,500.00	do	170.10	
do	do	8,424.35	8,000.00	Good..	18.70	
do	do	8,410.40	8,000.00	do	28.44	
do	do	6,730.00	6,500.00	Fair...	41.05	
do	do	6,750.00	6,500.00	do	157.36	
do	do	9,000.00	9,000.00	Good..		
do	do	12,500.00	12,500.00	do	107.99	Third Mississippi River District.
do	do	5,000.00	5,500.00	Fair...		
do	do	922.00	1,250.00	do	730.88	
do	do	2,093.00	1,250.00	do	800.60	
do	do	800.00	1,250.00	do	405.69	
do	do	2,477.00	1,250.00	do	1,009.66	
do	do	8,500.00	6,500.00	do	387.29	
do	do	13,164.00	10,500.00	Good..	75.30	
do	do	13,105.00	10,500.00	do	57.73	
do	do	13,386.00	10,500.00	do	11.70	
do	do	13,147.00	10,500.00	do	53.95	
do	do	12,980.00	11,000.00	do	79.36	
do	do	12,980.00	11,000.00	do	9.85	
do	do	3,535.00	3,300.00	do	32.88	
do	do	2,197.84	2,000.00	do		
do	do	6,956.00	250.00	Bad...	67.85	
do	do	6,956.00	250.00	do	53.59	
do	do	6,900.00	3,000.00	Good..	2,618.86	
do	do	6,900.00	3,000.00	do	3,015.79	
do	do	5,860.00	4,500.00	do	146.80	
do	do	5,860.00	4,500.00	do	183.84	
do	do	7,334.00	5,250.00	do	112.90	
do	do	7,322.00	5,250.00	do	99.17	
do	do	19,000.00	19,000.00	do		
do	do	750.00	725.00	Fair...	688.22	
do	Unknown.		350.00	do	50.66	
do	do	2,970.00	Nominal.	Bad...	19.33	
do	do	2,846.00	do	do	64.66	

* Machinery, etc., installed at Vicksburg, Miss.

* Formerly scow barge of same number.

TABLE III.—Statement of floating plant owned by the United States Army, Vicksburg, Miss. (THIRD MISSISSIPPI RIVER)—Continued.

Name or number.	Type.	Displacement.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
		Long tons.	Ft. in.	Ft. in.	Ft. in.		
572.	Scow barge (400 tons)	80 00	120 0	30 0	6 0	1900	Levanas, O.
575.	do.	80 00	120 0	30 0	6 0	1900	do.
580.	do.	80 00	120 0	30 0	6 0	1901	do.
581.	do.	80 00	120 0	30 0	6 0	1901	do.
582.	do.	80 00	120 0	30 0	6 0	1901	do.
591.	do.	80 00	120 0	30 0	6 0	1901	do.
595.	do.	80 00	120 0	30 0	6 0	1901	do.
596.	do.	80 00	120 0	30 0	6 0	1904	do.
597.	do.	80 00	120 0	30 0	6 0	1904	do.
599.	do.	80 00	120 0	30 0	6 0	1904	do.
072.	do.	80 00	120 0	30 0	6 0	1907	do.
074.	do.	80 00	120 0	30 0	6 0	1907	do.
077.	do.	80 00	120 0	30 0	6 0	1907	do.
078.	do.	80 00	120 0	30 0	6 0	1907	do.
079.	do.	80 00	120 0	30 0	6 0	1907	do.
081.	do.	80 00	120 0	30 0	6 0	1908	do.
082.	do.	80 00	120 0	30 0	6 0	1908	do.
084.	do.	80 00	120 0	30 0	6 0	1908	do.
101.	do.	71 25	123 0	30 0	6 0	1910	Keo-nir, Ia
102.	do.	71 25	123 0	30 0	6 0	1910	do.
103.	do.	71 25	123 0	30 0	6 0	1910	do.
104.	do.	71 25	123 0	30 0	6 0	1910	do.
105.	do.	71 25	123 0	30 0	6 0	1910	do.
106.	do.	71 25	123 0	30 0	6 0	1910	do.
107.	do.	71 25	123 0	30 0	6 0	1910	do.
108.	do.	71 25	123 0	30 0	6 0	1910	do.
109.	Scow barge (30 tons)	15 00	64 0	16 0	3 0	1910	do.
1014.	Scow barge (400 tons)	102 10	120 0	30 0	6 0	1910	Ambridge.
1101.	Scow barge (450 tons)	122 50	120 0	30 0	7 0	1911	New Orleans.
1102.	do.	122 50	120 0	30 0	7 0	1911	do.
1103.	do.	122 50	120 0	30 0	7 0	1911	do.
1104.	do.	122 50	120 0	30 0	7 0	1911	do.
1105.	do.	122 50	120 0	30 0	7 0	1911	do.
1106.	do.	122 50	120 0	30 0	7 0	1911	do.
1203.	do.	107 20	120 0	30 0	7 0	1912	Ambridge.
1204.	do.	107 20	120 0	30 0	7 0	1912	do.
1205.	do.	107 20	120 0	30 0	7 0	1912	do.
1207.	do.	107 20	120 0	30 0	7 0	1912	do.
1208.	do.	107 20	120 0	30 0	7 0	1912	do.
1209.	do.	107 20	120 0	30 0	7 0	1912	do.
1301.	do.	107 20	120 0	30 0	7 0	1913	do.
1302.	do.	107 20	120 0	30 0	7 0	1913	do.
1303.	do.	107 20	120 0	30 0	7 0	1913	do.
1304.	do.	107 20	120 0	30 0	7 0	1913	do.
1305.	do.	107 20	120 0	30 0	7 0	1913	do.
1306.	do.	107 20	120 0	30 0	7 0	1913	do.
1310.	Scow barge (30 tons)	17 00	64 0	16 0	3 0	1913	New Orleans.
1401.	Scow barge (450 tons)	122 50	120 0	30 0	7 0	1914	do.
1402.	do.	122 50	120 0	30 0	7 0	1914	do.
1403.	do.	122 50	120 0	30 0	7 0	1914	do.
1404.	do.	122 50	120 0	30 0	7 0	1914	do.
1405.	do.	122 50	120 0	30 0	7 0	1914	do.
1407.	do.	122 50	120 0	30 0	7 0	1914	do.
1501.	Scow barge (400 tons)	103 80	120 0	30 0	7 0	1915	Vicksburg.
1502.	do.	109 80	120 0	30 0	7 0	1915	do.
1505.	do.	109 80	120 0	30 0	7 0	1915	do.
1506.	do.	109 80	120 0	30 0	7 0	1915	do.
1507.	do.	109 80	120 0	30 0	7 0	1915	do.
1510.	do.	109 80	120 0	30 0	7 0	1915	do.
1511.	do.	109 80	120 0	30 0	7 0	1915	do.
1512.	do.	109 80	120 0	30 0	7 0	1915	do.
1601.	Scow barge (450 tons)	100 00	120 0	30 0	7 0	1916	Ambridge.
1602.	do.	100 00	120 0	30 0	7 0	1916	do.
1603.	do.	100 00	120 0	30 0	7 0	1916	do.
1604.	do.	100 00	120 0	30 0	7 0	1916	do.
1605.	do.	100 00	120 0	30 0	7 0	1916	do.
1606.	do.	100 00	120 0	30 0	7 0	1916	do.
1.	Flatboat	1 67	30 0	6 0	1 0	1894	Greenville.
2.	do.	1 67	30 0	6 0	1 0	1894	do.
6.	do.	4 90	38 0	14 0	2 0	1912	Vicksburg.

oyed in the Engineer Department at large on Dec. 31, 1916—Continued.

VICKSBURG, MISS. (THIRD MISSISSIPPI RIVER)—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Where.							
	Wood.		\$2,846.00	\$1,250.00	Fair...	\$265.47	
	do.		2,846.00	Nominal.		43.06	
	do.		3,184.00	1,250.00	Fair...	97.97	
	do.		3,184.00	1,500.00	do.	809.71	
	do.		3,184.00	1,500.00	do.	169.65	
	do.		3,184.00	1,500.00	do.	44.10	
	do.		3,184.00	1,500.00	do.	824.15	
	do.		3,184.00	Nominal.	do.	23.64	
	do.		3,184.00	750.00	do.	128.59	
	do.		3,184.00	750.00	do.	123.15	
	do.		3,184.00	1,000.00	Fair...		
	do.		3,972.00	2,100.00	Good.	46.72	
	do.		3,972.00	2,100.00	do.		
	do.		4,200.00	2,700.00	do.	1,852.73	
	do.		4,200.00	2,700.00	do.	1,830.92	
	do.		4,200.00	2,000.00	do.	32.51	
	do.		4,200.00	2,500.00	do.		
	do.		4,200.00	2,500.00	do.	182.81	
	do.		4,200.00	2,500.00	do.	45.10	
	do.		3,650.00	2,000.00	do.		
	do.		3,650.00	2,000.00	do.	9.51	
	do.		3,650.00	2,000.00	do.	25.92	
	do.		3,650.00	2,000.00	do.	36.65	
	do.		3,650.00	2,000.00	do.		
	do.		3,650.00	2,000.00	do.	2.00	
	do.		3,650.00	2,000.00	do.	31.71	
	do.		3,650.00	2,000.00	do.	5.90	
	do.		850.00	400.00	do.		
	Steel.		9,400.00	7,500.00	do.	36.45	
	Wood.		4,998.00	3,750.00	do.	8.78	
	do.		4,998.00	3,750.00	do.	3.60	
	do.		4,998.00	3,750.00	do.	61.09	
	do.		4,998.00	3,750.00	do.		
	do.		4,998.00	3,750.00	do.	10.20	
	do.		4,998.00	3,750.00	do.	16.50	
	Steel.		8,900.00	7,250.00	do.		
	do.		8,900.00	7,250.00	do.	391.23	
	do.		8,900.00	7,250.00	do.		
	do.		8,900.00	7,250.00	do.		
	do.		8,900.00	7,250.00	do.	210.51	
	do.		8,900.00	7,250.00	do.		
	do.		8,900.00	7,250.00	do.	50.53	
	do.		8,500.00	7,750.00	do.	134.50	
	do.		8,500.00	7,750.00	do.		
	do.		8,500.00	7,750.00	do.		
	do.		8,500.00	7,750.00	do.	199.91	
	do.		8,500.00	7,750.00	do.	184.52	
	do.		8,500.00	7,750.00	do.		
	Wood.		1,446.00	1,000.00	do.	6.25	
	do.		4,750.00	4,100.00	do.	48.47	
	do.		4,750.00	4,100.00	do.		
	do.		4,750.00	4,100.00	do.	11.20	
	do.		4,750.00	4,100.00	do.	8.00	
	do.		4,750.00	4,100.00	do.		
	do.		4,750.00	4,100.00	do.		
	do.		4,395.53	4,200.00	do.		
	do.		4,395.53	4,200.00	do.	2.00	
	do.		4,395.53	4,200.00	do.	109.57	
	do.		4,395.53	4,200.00	do.		
	do.		4,049.55	3,900.00	do.		
	do.		4,049.55	3,900.00	do.		
	do.		4,049.55	3,900.00	do.	4.29	
	do.		4,049.55	3,900.00	do.		
	Steel.		7,500.00	7,500.00	do.		
	do.		7,500.00	7,500.00	do.		
	do.		7,500.00	7,500.00	do.		
	do.		7,500.00	7,500.00	do.	142.32	
	do.		7,500.00	7,500.00	do.		
	do.		7,500.00	7,500.00	do.		
	Wood.		60.00	10.00	Bad.		
	do.		60.00	10.00	do.		
	do.		425.00	100.00	do.		

Third Mississippi River District.

TABLE III.—Statement of floating plant owned by the United States Army.

WASHINGTON, D. C.

Name or number.	Type.	Dis- place- ment.	Dimensions.			When.	Built.
			Length.	Beam.	Depth.		
		Long tons.	Ft. in.	Ft. in.	Ft. in.		Where.
Dalecarlia.....	Hydraulic pipe-line dredge.	233.30	80 0	26 0	7 0	1912	Hull, Balt. Md.
York.....	Snag boat.....	110.00	72 6	22 9	6 0	1910	Machinery,ington, D. C.
Castle.....	Tugboat.....	165.30	95 0	20 2	10 6	1897	Rebuilt, W. ton, D. C.
Atlas.....	Derrick boat.....	186.33	72 0	34 0	5 0	1915	Baltimore, M.
Ana.....	Gasoline launch.....	2.50	30 3	6 6	2 5	1916	Alexandria,
Averill.....	do.....	9.00	36 0	10 6	4 6	1916	Washington
Bell.....	do.....	.50	16 4	4 4	1 9	1912	Annapolis, M.
Relee.....	do.....	6.50	40 4	10 4	4 2	1916	Washington
Colonel Leach.....	Gasoline launch (tow-boat).	8.30	36 4	10 6	4 5	1913	do. ¹
No. 2.....	Scow, deck (24-ton).....	20.00	34 0	24 0	3 3	(?)	Baltimore, M.
No. 4.....	Scow, deck (100-ton).....	55.00	72 0	26 0	6 0	1911	Raised from Basin in 1916
No. 5.....	do.....	55.00	72 0	26 0	6 0	1912	Alexandria,
No. 6.....	Scow, deck (8-ton).....	6.00	20 0	12 0	1 0	1907	West Point,
No. 7.....	Scow, deck (50-ton water tank).	18.00	40 0	18 0	4 8	1913	Washington
No. 8.....	do.....	18.00	40 0	18 0	4 8	1913	do.
Nos. 2-40.....	Pontoons.....	5.00	16 0	6 2	2 0	1907	do.
Nos. 41-47.....	do.....	5.00	16 3	6 9	2 3	1915	do.
No. 48.....	Pontoon.....	5.00	12 8	6 0	1 10	1916	do.
No. 49.....	do.....	5.00	16 8	7 0	2 0	1916	do.
No. 3.....	Rowboat.....		16 0	5 0	1 6	1913	Built on work
No. 4.....	do.....		17 4	4 11	1 7	(?)	do.
No. 5.....	do.....		16 0	4 6	1 4	1912	Washington
No. 6.....	do.....		16 0	5 0	1 6	1914	do.
No. 8.....	do.....		14 6	4 6	1 3	(?)	do.
No. 9.....	do.....		16 0	4 6	1 3	1915	Washington
No. 10.....	do.....		17 6	4 8	1 3	1914	West Point,
No. 11.....	do.....		16 0	5 1	1 4	1915	Washington
No. 12.....	do.....		18 2	4 7	1 7	1902	do.
No. 13.....	do.....		16 0	5 1	1 4	1915	do.
No. 14.....	do.....		15 11	4 5	1 9	1916	do.
No. 15.....	do.....		15 0	5 2	1 8	1916	do.
No. 16.....	do.....		15 0	5 4	1 6	1916	do.
No. 17.....	do.....		15 9	4 8	1 6	1916	do.
No. 18.....	do.....		15 0	4 2	1 2	1916	do.
No. 19.....	do.....		16 0	4 0	1 3	1914	Fort Hunt,
No. 20.....	do.....		16 0	4 2	1 3	1909	Salem, Ohio
No. 21.....	do.....		18 6	5 10	2 6	(?)	New London
No. 22.....	do.....		14 0	4 6	2 8	(?)	do.
No. 23.....	Lifeboat.....		18 8	5 7	2 3	1915	Baltimore, M.
No. A.....	Rowboat.....		16 0	4 3	1 4	1912	Great Falls,
No. B.....	do.....		13 6	3 8	1 3	1912	Washington
No. 1.....	Canoe.....		17 0	2 10	1 2	(?)	Veazie, Me.

¹ Rebuilt in 1916.² Unknown.

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

WASHINGTON, D. C.

Purchased.						
Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
{Contract (rebuilt by hired labor).}	Wood.	\$18,530.00	\$33,000.00	{Excellent.}	\$3,856.42	River and harbor works.
Petersburg, Va.	do.	6,129.75	7,000.00	Good.	703.98	Do.
Transferred from New London, Conn., 1911.	Steel.	24,973.32	20,000.00	do.	376.94	Do.
Contract.	do.	25,088.00	47,000.00	Excellent.	None.	Do.
Washington, D. C.	Wood.	60.00	500.00	do.	331.86	Do.
Contract.	do.	3,931.00	4,500.00	do.	None.	Do.
Washington, D. C.	do.	378.48	270.00	Good.	36.65	Do.
Norfolk, Va.	do.	999.32	1,200.00	Excellent.	641.95	Do.
Contract.	do.	2,397.37	2,070.00	Good.	358.73	Do.
do.	do.		25.00	Poor.	612.75	Do.
Alexandria, Va.	do.	2,511.60	2,500.00	Good.	140.50	Do.
West Point, Va.	do.	2,350.00	2,350.00	do.		Do.
Washington, D. C.	do.	225.00	100.00	Fair.		Do.
Built on works.	do.	1,410.85	1,400.00	Good.	137.62	Do.
do.	do.	1,480.38	1,400.00	do.	128.50	Do.
Washington, D. C.	do.	* 75.52	* 20.00	Poor.		Do.
Built on works.	do.	* 104.32	* 105.00	Good.		Do.
do.	do.	49.00	60.00	Excellent.		Do.
do.	do.	56.00	75.00	do.		Do.
do.	do.	61.27	40.00	Good.		Do.
Woodbridge Va.	do.	40.00	25.00	do.		Do.
Built on works.	do.	35.00	20.00	Fair.		Do.
do.	do.	75.81	50.00	do.		Do.
Washington, D. C.	do.	27.50	8.00	do.		Do.
Hired labor.	do.	69.50	45.00	Good.		Do.
do.	do.	55.00	20.00	Fair.		Do.
do.	do.	56.28	40.00	Good.		Do.
do.	do.	120.00	30.00	Fair.		Do.
do.	do.	62.60	50.00	Good.		Do.
do.	do.	40.32	60.00	Excellent.		Do.
do.	do.	61.33	60.00	do.		Do.
do.	do.	57.28	60.00	do.		Do.
do.	do.	59.11	60.00	do.		Key bridge.
do.	do.	59.11	60.00	do.		Do.
Fort Hunt, Va.	do.	25.00	25.00	Good.		Fortification works.
Salem, Ohio.	Steel.	45.00	(1)			Do.
do.	Wood.		75.00	Good.		River and harbor works.
do.	do.		30.00	Fair.		Do.
Baltimore, Md.	Steel.	115.00	115.00	Good.		Do.
do.	Wood.	24.00	24.00	Fair.		Washington Aqueduct.
do.	do.	24.00	24.00	do.		Do.
Washington, D. C.	do.	35.00	20.00	Good.		River and harbor works.

* Each.

† Worthless; to be condemned.

TABLE III.—Statement of floating plant owned by the United States and

WASHINGTON BARRACKS, D. C.

Name or number.	Type.	Displacement.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
Engineer.....	Gasoline launch.....	Long tons. 4.00	Ft. in. 30 0	Ft. in. 6 6	Ft. in. 4 3	1908	Gas Engine & Power Co., New York City.
Pontonier.....	Steamboat.....	50.00	80 0	18 0	8 0	1908	Gas Engine & Power Co. and Chas. L. Seabury & Sons Co., New York City.

WHEELING, W. VA.

Colonel M. B. Adams.	Dipper dredge.....	525.00	112 0	34 0	7 3	1912	Huntington, W. Va.
Addison.....	do.....	177.00	75 0	30 0	7 2	1890	Kanawha River ¹
Ravenswood.....	do.....	238.00	80 0	34 0	6 6	1902	McKeesport, Pa.....
Mason.....	Sand digger.....	300.00	100 0	27 0	5 6	1915	Dam No. 28, Ohio River.
Rosecrans.....	do.....	200.00	111 0	22 0	5 0	1907	Dam No. 3, Ohio River.
Captain Turtle.....	Derrick boat.....	88.00	65 0	30 0	4 0	1910	Marietta, Ohio.....
U. S. E. D. Wheeling No. 2.	do.....	170.00	74 9	35 0	4 1	1914	Dam No. 28, Ohio River.
U. S. E. D. Wheeling No. 3.	do.....	140.00	75 0	35 0	4 7	1914	do.....
U. S. E. D. Wheeling No. 24.	do.....	160.00	75 0	35 0	4 10	1910	Dam No. 28, Ohio River.
U. S. E. D. Kanawha No. 29.	do.....	35.00	62 0	24 0	3 8	1912	Point Pleasant, W. Va.
L. K. No. 7.....	do.....	93.00	70 0	22 0	4 10	1913	Dam No. 18, Ohio River.
U. S. E. D. Wheeling No. 43.	do.....	170.00	75 0	35 0	4 6	1915	Dam No. 28, Ohio River.
U. S. E. D. Wheeling No. 44.	do.....	160.00	75 0	35 0	4 5	1915	do.....
U. S. E. D. Wheeling No. 10.	Maneuver boat.....	70.00	60 0	22 0	3 8	1909	Elizabeth, Pa.....
U. S. E. D. Wheeling No. 11.	do.....	70.00	60 0	22 0	3 8	1909	do.....
U. S. E. D. Wheeling No. 22.	do.....	70.00	60 0	22 0	3 8	1910	Freedom, Pa.....
U. S. E. D. Wheeling No. 23.	do.....	70.00	60 0	22 0	3 8	1910	do.....
U. S. E. D. Wheeling No. 32.	do.....	74.00	60 0	22 2	3 8	1915	Pittsburgh, Pa.....
U. S. E. D. Wheeling No. 37.	do.....	82.00	60 0	22 0	3 8	1916	do.....
U. S. E. D. Wheeling No. 38.	do.....	82.00	60 0	22 0	3 8	1916	do.....
U. S. E. D. Wheeling No. 39.	do.....	82.00	60 0	22 0	3 8	1916	do.....
U. S. E. D. Wheeling No. 40.	do.....	82.00	60 0	22 0	3 8	1916	do.....
Crozet.....	Towboat (paddle).....	101.00	115 0	19 0	3 0	1908	Evansville, Ind.....
General Craighill.	do.....	198.00	133 9	28 0	4 3	1911	Jeffersonville, Ind.....
James Rumsey.....	Towboat (screw).....	122.00	120 0	22 0	4 3	1903	Charleston, W. Va.....
Nanina.....	Gasoline launch (screw).....	6.00	42 5	7 5	3 11	1911	Louisville, Ky.....
Monroe.....	do.....	4.00	40 0	8 6	4 0	1913	Bay City, Mich.....
U. S. E. D. Wheeling No. 33.	Gasoline launch (motor).....	1.50	22 0	5 10	1 10	1914	Pittsburgh, Pa.....
U. S. E. D. Wheeling No. 34.	do.....	1.50	22 0	5 10	1 10	1914	do.....
U. S. E. D. Wheeling No. 36.	do.....	1.90	22 0	5 10	1 10	1914	do.....

¹ Rebuilt 1910-11.² Second hand.

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

WASHINGTON BARRACKS, D. C.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
	Where.						
98	New York City.	Wood.	\$1,800.00	\$225.00	Very poor.		Instruction of Engineer troops at the Engineer School, Washington Barracks, D. C.
03	do.	do.	18,750.00	9,000.00	do.	\$663.00	Do.

WHEELING, W. VA.

		Steel..	\$44,577.86	\$26,000.00	Good..	\$4,585.04	Ohio River improvement.
		Wood..	14,000.00	9,000.00	do.	1,240.07	Kanawha River improvement.
15	Ravenswood, W. Va.	do.	* 23,000.00	15,000.00	Poor..	5,646.50	Ohio River improvement.
		do.	17,169.09	14,000.00	Good..	1,177.44	Do.
10	Dam No. 26, Ohio River.	do.	* 12,000.00	3,000.00	Poor..	3,470.16	Do.
		do.	8,200.00	5,000.00	Good..	431.64	Kanawha River improvement.
08	Parkersburg, W. Va.	do.	* 9,106.48	6,000.00	do.	2,127.91	Ohio River improvement.
08	do.	do.	* 11,026.61	7,000.00	do.	1,709.00	Do.
		do.	9,875.95	3,000.00	Fair..	2,187.90	Do.
		do.	1,912.00	900.00	Good..	45.90	Kanawha River improvement.
		do.	4,910.66	3,500.00	do.	344.71	Little Kanawha River improvement.
		do.	10,780.88	9,000.00	do.	1,229.84	Ohio River improvement.
		do.	11,235.75	9,000.00	do.	1,095.94	Do.
		do.	5,104.35	1,800.00	Fair..	460.26	Do.
		do.	6,200.00	2,500.00	Good..	845.30	Do.
		do.	5,200.00	2,100.00	do.	66.27	Do.
		do.	5,200.00	2,600.00	do.	32.80	Do.
		Steel..	8,820.25	7,800.00	do.	267.84	Do.
		do.	8,583.11	8,583.00	do.		Do.
		do.	8,583.11	8,583.00	do.		Do.
		do.	8,583.11	8,583.00	do.		Do.
		do.	8,583.11	8,583.00	do.	20.54	Do.
5	Evansville, Ind.	Wood.	* 8,500.00	6,500.00	Poor..	2,004.91	Do.
		Steel..	27,550.00	14,000.00	Good..	4,384.10	Do.
		do.	30,942.00	15,000.00	do.	565.63	Kanawha River improvement.
		Wood.	3,089.53	800.00	Bad..	360.50	Do.
3	Bay City, Mich.	do.	3,058.88	1,000.00	Fair..	206.81	Ohio River improvement.
4	Pittsburgh, Pa.	do.	381.87	50.00	Poor..	44.70	Do.
4	do.	do.	355.00	200.00	Good..		Do.
4	do.	do.	405.16	250.00	do.		Do.

rebuilt 1914 at Dam No. 23, Ohio River; originally purchased second hand in 1908 at \$2,000 each.

TABLE III.—Statement of floating plant owned by the United States Army.

WHEELING, W. VA.—Continued.

Name or number.	Type.	Dis- placement.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
Glenville.....	Gasoline launch (pad- dle).	<i>Long tons.</i> 10.00	<i>Ft. in.</i> 53 0	<i>Ft. in.</i> 9 0	<i>Ft. in.</i> 3 0	1912	Grafton, Ill.
U. S. E. D. Kanawha No. 28.	Quarter boat.....	33.00	65 0	20 0	3 9	1910	Marietta, Oh.
U. S. E. D. Kanawha No. 27.	Dump boat (side).....	32.00	58 0	20 0	5 9	1906	Point Pleasant, Va.
U. S. E. D. Kanawha No. 33.	.....do.....	32.00	58 0	20 0	5 9	1915	.....do.....
U. S. E. D. Kanawha No. 34.	.....do.....	32.00	58 0	20 0	5 9	1915	.....do.....
U. S. E. D. Wheeling No. 27.	Dump scow.....	110.00	80 0	22 0	6 5	1912	Pittsburgh, Pa.
U. S. E. D. Wheeling No. 28.	.....do.....	110.00	80 0	22 0	6 5	1912	.....do.....
U. S. E. D. Wheeling No. 41.	.....do.....	60.00	70 4	20 9	6 9	1914	Parkersburg, W. Va.
U. S. E. D. Wheeling No. 42.	.....do.....	60.00	70 4	20 9	6 9	1914	.....do.....
U. S. E. D. Wheeling No. 6.	Flatboat.....	10.00	40 0	12 0	3 2	1911	Dam No. 11, River.
U. S. E. D. Wheeling No. 7.	.....do.....	36.00	90 0	16 0	4 4	1909	Dam No. 20, River.
U. S. E. D. Wheeling No. 8.	Flatboat (half-decked) ..	33.00	75 0	16 0	4 1	1909	.....do.....
U. S. E. D. Wheeling No. 9.	.....do.....	33.00	75 0	16 0	4 1	1909	.....do.....
U. S. E. D. Wheeling No. 13.	Barge (decked).....	80.00	100 0	22 0	4 11	1912	Pittsburgh, Pa.
U. S. E. D. Wheeling No. 14.	.....do.....	80.00	100 0	22 0	4 11	1912	.....do.....
U. S. E. D. Wheeling No. 1.	Flatboat.....	10.00	40 0	12 0	3 2	1916	Dam No. 13, River.
U. S. E. D. Wheeling No. 2.	.....do.....	10.00	40 0	12 0	3 2	1916	.....do.....
U. S. E. D. Wheeling No. 3.	.....do.....	10.00	40 0	12 0	3 2	1916	.....do.....
U. S. E. D. Wheeling No. 15.	.....do.....	60.00	90 0	16 0	4 7	1910	Dam No. 26, River.
U. S. E. D. Wheeling No. 16.	.....do.....	60.00	90 0	16 0	4 7	1910	.....do.....
U. S. E. D. Wheeling No. 17.	.....do.....	60.00	90 0	16 0	4 7	1910	.....do.....
U. S. E. D. Wheeling No. 18.	.....do.....	60.00	90 0	16 0	4 7	1910	.....do.....
U. S. E. D. Wheeling No. 19.	.....do.....	10.00	40 0	14 0	3 0	1910	Dam No. 13, River.
U. S. E. D. Wheeling No. 25.	.....do.....	50.00	75 0	16 0	4 1	1911	Dam No. 26, River.
U. S. E. D. Wheeling No. 26.	.....do.....	50.00	75 0	16 0	4 1	1911	.....do.....
U. S. E. D. Wheeling No. 29.	.....do.....	10.00	40 0	12 0	2 4	1911	Point Pleasant, Va.
U. S. E. D. Wheeling No. 37.	Barge (decked).....	83.00	80 0	30 0	5 4	1908	St. Louis, Mo.
U. S. E. D. Wheeling No. 31.	.....do.....	83.00	80 0	30 0	5 4	1910	.....do.....
U. S. E. D. Wheeling No. 35.	Flatboat (decked).....	16.00	50 0	15 0	3 4	1914	Dam No. 18, River.
U. S. E. D. Wheeling No. 45.	Pump boat.....	292.00	100 0	30 0	5 1	1915	Dam No. 28, River.
U. S. E. D. Wheeling No. 46.	.....do.....	222.00	100 0	30 0	5 1	1915	Dam No. 22, River.
U. S. E. D. Wheeling No. 47.	Flatboat (decked).....	80.00	90 0	20 0	4 9	1915	Dam No. 26, River.
U. S. E. D. Wheeling No. 48.	.....do.....	80.00	90 0	20 0	4 9	1915	.....do.....
U. S. E. D. Wheeling No. 49.	.....do.....	80.00	90 0	20 0	4 9	1915	.....do.....
U. S. E. D. Wheeling No. 50.	.....do.....	80.00	90 0	20 0	4 9	1915	.....do.....

1 Second hand.

FLOATING PLANT.

3973

loyed in the Engineer Department at large on Dec. 31, 1916—Continued.

WHEELING, W. VA.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
	Where.						
		Steel..	\$2,679.15	\$1,300.00	Good..	\$192.46	Little Kanawha River improvement.
		Wood..	2,000.00	900.00	do..	45.17	Kanawha River improvement.
		do..	1,850.00		Worthless.		Do.
		do..	2,625.00	2,000.00	Good..		Do.
		do..	2,625.00	2,000.00	do..		Do.
		do..	5,910.00	2,500.00	do..	53.12	Ohio River improvement.
		do..	5,910.00	2,500.00	do..	63.99	Do.
	Ravenswood, W. Va.	do..	1,350.00	2,500.00	do..		Do.
	do..	do..	1,350.00	2,500.00	do..		Do.
		do..	284.42	175.00	do..	5.00	Do.
		do..	799.00	100.00	Poor..	23.00	Do.
		do..	654.00	150.00	do..	14.18	Do.
		do..	654.00	150.00	do..	197.84	Do.
		do..	3,050.00	1,200.00	Fair..	81.52	Do.
		do..	3,050.00	1,200.00	do..	59.25	Do.
		do..	304.13	304.00	Good..		Do.
		do..	304.13	304.00	do..		Do.
		do..	357.87	357.00	do..		Do.
		do..	1,000.00	250.00	Poor..	90.18	Do.
		do..	1,000.00	100.00	do..	3.00	Do.
		do..	1,000.00	150.00	do..		Do.
		do..	1,000.00	250.00	do..	72.50	Do.
		do..	400.00	160.00	Fair..		Do.
		do..	845.39	100.00	Poor..	4.00	Do.
		do..	845.39	150.00	do..		Do.
		do..	325.00	175.00	Good..		Do.
	Kenova, W. Va.	do..	1,000.00	300.00	do..	43.12	Do.
	do..	do..	1,000.00	300.00	Fair..	347.32	Do.
		do..	546.58	400.00	Good..		Do.
		do..	10,252.13	8,100.00	do..	17.50	Do.
		do..	14,620.71	13,000.00	do..	2,053.57	Do.
		do..	1,906.66	1,200.00	do..	74.87	Do.
		do..	1,867.56	1,200.00	do..		Do.
		do..	1,906.66	1,200.00	do..	66.91	Do.
		do..	1,867.56	1,200.00	do..		Do.

TABLE III.—Statement of floating plant owned by the United States Army.

WHEELING, W. VA.—Continued.

Name or number.	Type.	Displacement.	Dimensions.			When built.	Where built.
			Length.	Beam.	Depth.		
		<i>Long tons.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>	<i>Ft. in.</i>		
U. S. E. D. Wheeling No. 51.	Flatboat (decked).....	80.00	90 0	20 0	4 9	1915	Dam No. 2 River.
U. S. E. D. Wheeling No. 52.	.....do.....	80.00	90 0	20 0	4 9	1915	.....do.....
U. S. E. D. Wheeling No. 53.	.....do.....	80.00	90 0	20 0	4 9	1915	Dam No. 2 River.
U. S. E. D. Wheeling No. 54.	.....do.....	80.00	90 0	20 0	4 9	1915	.....do.....
U. S. E. D. Wheeling No. 55.	.....do.....	80.00	90 0	20 0	4 9	1915	.....do.....
U. S. E. D. Wheeling No. 56.	.....do.....	80.00	90 0	20 0	4 9	1915	.....do.....
U. S. E. D. Wheeling No. 57.	.....do.....	80.00	90 0	20 0	4 9	1915	.....do.....
U. S. E. D. Wheeling No. 58.	Flatboat.....	10.00	40 0	12 0	3 0	1915	Dam No. 1 River.
U. S. E. D. Wheeling No. 59.	.....do.....	10.00	40 0	12 0	3 2	1915	.....do.....
U. S. E. D. Wheeling No. 60.	.....do.....	10.00	40 0	12 0	3 2	1915	Dam No. 1 River.
U. S. E. D. Wheeling No. 61.	.....do.....	10.00	40 0	12 0	3 0	1915	.....do.....
U. S. E. D. Wheeling No. 62.	.....do.....	10.00	40 0	12 0	3 2	1915	.....do.....
U. S. E. D. Wheeling No. 63.	Concrete mixer boat.....	480.00	90 0	40 0	7 1	1916	Dams Nos. 22, Ohio R.
U. S. E. D. Wheeling No. 64.	Flatboat.....	80.00	90 0	20 0	5 0	1916	.....do.....
U. S. E. D. Wheeling No. 65.	.....do.....	80.00	90 0	20 0	5 0	1916	.....do.....
U. S. E. D. Wheeling No. 66.	.....do.....	92.00	100 0	22 0	5 0	1916	.....do.....
U. S. E. D. Wheeling No. 67.	.....do.....	92.00	100 0	22 0	5 0	1916	.....do.....
U. S. E. D. Kanawha No. 30.	Flatboat (decked).....	35.00	70 0	18 0	3 9	1912	Point Pleasant, Va.
U. S. E. D. Kanawha No. 31.	.....do.....	35.00	70 0	18 0	3 9	1912	.....do.....
U. S. E. D. Kanawha No. 32.	Flatboat.....	28.00	80 0	18 0	4 2	1912	.....do.....
No. 4A2.....	Derrick service boat.....	30.00	59 0	20 0	2 4	1908	Charleston, Va.
No. 5A2.....	.....do.....	30.00	59 0	20 0	2 4	1912	.....do.....
No. 6A2.....	.....do.....	30.00	59 0	20 0	2 4	1907	.....do.....
No. 7A2.....	.....do.....	30.00	59 0	20 0	2 4	1911	.....do.....
No. 8A3.....	.....do.....	30.00	59 0	20 0	2 4	1912	.....do.....
No. 9A2.....	.....do.....	30.00	59 0	20 0	2 4	1908	.....do.....
No. 10A3.....	.....do.....	30.00	59 0	20 0	2 4	1915	Elizabeth, Va.
No. 11A3.....	.....do.....	30.00	59 0	20 0	2 4	1914	Point Pleasant, Va.
No. 2B2.....	Service boat.....	4.00	40 0	7 4	2 1	1908	Charleston, Va.
No. 3B2.....	.....do.....	4.00	40 0	7 4	2 1	1908	.....do.....
No. 4B2.....	.....do.....	4.00	40 0	7 4	2 1	1903	.....do.....
No. 5B3.....	.....do.....	4.00	40 0	7 4	2 1	1914	Point Pleasant, Va.
No. 6B2.....	.....do.....	4.00	40 0	7 4	2 1	1913	Lock No. 6, Ohio R.
No. 7B2.....	.....do.....	4.00	40 0	7 4	2 1	1910	Lock No. 7, Ohio R.
No. 8B2.....	.....do.....	4.00	40 0	7 4	2 1	1910	Lock No. 8, Ohio R.
No. 9B.....	.....do.....	4.00	40 0	7 4	2 1	1898	Montgomery, Va.
No. 10B2.....	.....do.....	4.00	40 0	7 4	2 1	1909	Lock No. 10, Ohio R.
No. 11B2.....	.....do.....	4.00	40 0	7 4	2 1	1910	Lock No. 11, Ohio R.

1 Uncompleted.

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

WHEELING, W. VA.—Continued.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
	Where.						
		Wood.	\$1,867.56	\$1,200.00	Good.		Ohio River improvement.
		do.	1,867.56	1,200.00	do.		Do.
		do.	1,906.66	1,200.00	do.	\$37.22	Do.
		do.	1,906.66	1,200.00	do.	56.43	Do.
		do.	1,906.65	1,200.00	do.	20.45	Do.
		do.	1,906.65	1,200.00	do.	68.68	Do.
		do.	1,906.65	1,200.00	do.	324.15	Do.
		do.	270.00	225.00	do.		Do.
		do.	270.00	225.00	do.		Do.
		do.	384.00	325.00	do.		Do.
		do.	384.00	300.00	do.		Do.
		do.	384.00	325.00	do.	10.68	Do.
		do.	33,263.52	33,263.00	New.	651.36	Do.
		do.	2,843.04	2,600.00	Good.		Do.
		do.	2,843.04	2,600.00	do.		Do.
		do.	2,950.90	2,700.00	do.		Do.
		do.	2,950.90	2,700.00	do.		Do.
		do.	1,050.00	550.00	do.		Kanawha River improvement.
		do.	1,050.00	550.00	do.		Do.
		do.	1,265.00	750.00	do.		Do.
		do.	900.00	100.00	do.	265.82	Do.
		do.	900.00	450.00	do.		Do.
		do.	750.00	50.00	Poor.		Do.
		do.	920.00	350.00	Good.		Do.
		do.	900.00	450.00	do.		Do.
		do.	900.00	25.00	Very poor.		Do.
		do.	932.50	700.00	Good.		Do.
		do.	902.34	600.00	do.	273.06	Do.
		do.	200.00	30.00	Poor.		Do.
		do.	200.00	30.00	do.		Do.
		do.	190.00		Worthless.		Do.
		do.	235.33	125.00	Good.		Do.
		do.	121.00	65.00	do.		Do.
		do.	106.00	20.00	Poor.		Do.
		do.	105.00	20.00	do.		Do.
		do.	107.00		Worthless.		Do.
		do.	117.00	20.00	Poor.		Do.
		do.	110.00	20.00	do.		Do.

TABLE III.—Statement of floating plant owned by the United States Army.

WILMINGTON, DEL.

Name or number.	Type.	Displacement.	Dimensions.			Built.	
			Length.	Beam.	Depth.	When.	Where.
Gannet.....	Gasoline cruiser (survey or inspection boat).	Long tons. 20.00	Ft. in. 73 0	Ft. in. 12 6	Ft. in. 5 2	1907	Quincy Point, Del.
No. 1.....	Launch (power tender).....		14 0	4 0	2 6	1907	.....do.....
Hinda.....	Gasoline launch.....	1.80	28 0	7 6	4 3	1907	Morris Heights, N. Y.
Absecon.....	Seagoing hopper dredge.....	994.00	161 10	36 6	12 0	1914	Baltimore, Md.
Absecon.....	Launch (power tender).....		20 0	8 0	3 0	1914	Holly Oak, N. C.
Minquas.....	Seagoing hopper dredge.....	1,105.00	152 0	30 0	12 0	1915	Baltimore, Md.
Minquas.....	Launch (power tender).....		18 2	6 3	2 8	1915	Holly Oak, N. C.

WILMINGTON, N. C.

Cape Fear.....	Seagoing hopper dredge.....	490.00	131 3	29 0	12 0	1865	Philadelphia, Pa.
Henry Bacon ^a	Hydraulic pipe-line dredge.....	1,410.00	150 6	39 0	15 0	1907	Westlake, La.
Croatan ^a	do.....	235.00	80 0	23 6	8 0	1911	Camden, N. J.
Ajax.....	Clamshell dredge.....	400.00	82 0	32 8	10 4	1884	Port Royal, S. C.
Hercules.....	do.....	670.00	100 0	38 0	11 4	1907	Jersey City, N. J.
Scuppernon.....	do.....	220.00	78 0	32 0	7 0	1904	Newbern, N. C.
Trent.....	Snag boat.....	120.00	70 0	20 0	5 0	1899	.....do.....
Wright, Gen. H. G.....	do.....	130.00	101 6	25 0	6 6	1882	Wilmington, N. C.
Black.....	Derrick boat.....	35.00	45 0	20 0	3 9	1910	.....do.....
Contentnia.....	do.....	32.00	40 0	20 0	4 0	1911	Newbern, N. C.
Lilliput.....	Pile driver.....	82.00	60 0	24 0	5 1	1903	Wilmington, N. C.
Mercur ^a	Steam launch.....	60.00	83 0	13 3	7 0	1832	New York, N. Y.
Caswell, Richard.....	Tugboat.....	200.00	84 9	18 6	10 0	1900	Baltimore, Md.
Coquet.....	do.....	120.00	59 0	18 6	7 0	1906	Madison, Md.
Cynthia.....	do.....	135.00	74 7	17 10	7 10	1901	Baltimore, Md.
Frances.....	Gasoline launch.....	7.00	43 0	7 10	3 0	1906	Muskegon, Mich.
Olive.....	do.....	5.00	34 0	8 0	3 2	1892	Morris Heights, N. Y.
Nancy.....	do.....	7.75	30 0	6 5	2 0	1903	New York, N. Y.
Polly.....	do.....	2.00	16 0	4 6	2 6	1898	Derby, Conn.
Robert J.....	do.....	1.00	24 0	4 6	2 0	1911	Newbern, N. C.
Spry.....	do.....	2.00	18 6	5 4	3 8		
Faber.....	do.....	10.00	42 0	10 0	4 0	1897	Berwick, La.

^a Unknown. This launch included in purchase price of Gannet.^b This launch included in contract price of dredge.^c Formerly the No. 1.^d Including plant.

employed in the Engineer Department at large on Dec. 31, 1916—Continued.

WILMINGTON, DEL.

Purchased.		Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
When.	Where.						
1910	Wilmington, Del.	Wood.	\$11,000.00	\$12,000.00	Good..	\$555.91	River and harbor improvements in Wilmington (Fel.) district.
1916	do	do	(¹)	145.00	do		do.
1907	Morris Heights, N. Y.	do	2,600.00	1,500.00	do	718.31	Improving Wilmington Harbor, Fel.
		Steel	178,949.28	178,949.23	do	2,687.69	Improving Absecon Inlet and Coldspring Inlet, N. J.
		Wood.	825.00	725.00	do		do.
		Steel	188,705.33	188,705.33	do	5,393.96	Improving Wilmington Harbor, Del.
		Wood.	(²)	800.00	do	30.43	do.

WILMINGTON, N. C.

		Wood.	\$60,809.30	\$42,000.00	do	\$2,728.67	Improving Cape Fear River, N. C., at and below Wilmington.
1914	Wilmington, N. C.	do	124,000.00	95,000.00	do	10,829.29	do.
		do	22,000.00	35,000.00	do	8,917.97	Improving rivers and harbors, Newbern, N. C., subdistrict.
1897	Charleston, S. C.	do	16,050.00	18,000.00	do		Improving Cape Fear River, N. C., at and below Wilmington.
1907	Jersey City, N. J.	do	61,350.00	38,000.00	do	1,310.11	do.
		do	10,309.00	7,200.00	Fair	245.05	Improving rivers and harbors, Newbern, N. C., subdistrict.
		do	8,500.00	700.00	Poor		do.
		do	3,000.00	5,500.00	Good		Improving Northeast, Black and Cape Fear Rivers, N. C.
		do	1,300.00	900.00	Fair	73.36	do.
		do	3,000.00	2,500.00	Good	464.92	Improving rivers and harbors, Newbern, N. C., subdistrict.
		do	1,485.00	750.00	Bad		Improving Cape Fear River, N. C., at and below Wilmington.
1899	New York, N. Y.	Steel	11,000.00	6,750.00	Fair	1,580.10	do.
		do	20,500.00	15,500.00	Good	272.08	do.
1897	Baltimore, Md.	Wood.	8,000.00	4,080.00	Fair		Improving various rivers and harbors, Wilmington, N. C.
1897	Charleston, S. C.	do	8,500.00	10,000.00	Good	803.48	Improving Cape Fear River, N. C., at and below Wilmington.
1908	Beaufort, N. C.	do	600.00	2,200.00	do	187.99	Improving rivers and harbors, Newbern, N. C., subdistrict.
1906	Wilmington, N. C.	do	1,700.00	800.00	do	137.47	do.
		do	2,065.00	1,400.00	do	1,150.12	Improving Cape Fear River, N. C., at and below Wilmington.
		do	550.00	75.00	Poor		Gun and mortar batteries.
		do	100.00	25.00	do		Improving rivers and harbors, Newbern, N. C., subdistrict.
		do		90.00	Fair	128.17	Improving Cape Fear River, N. C., at and below Wilmington.
1914	Wilmington, N. C.	do	(¹⁰)	1,800.00	do	33.72	do.

¹ Formerly the dredge Miller.

² Rebuilt in 1896, Wilmington, N. C.

³ Hull only.

⁴ Formerly the Mary Lily.

⁵ Rebuilt at Morehead City, N. C., 1913.

¹⁰ Included in cost of dredge Henry Bacon.

TABLE III.—Statement of floating plants owned by the United States and
WILMINGTON, DEL.—Continued.

Name or number.	Type.	Dis- place- ment.	Dimensions.			Built.	
			Length.	Breadth.	Depth.	When.	Where.
Neuse.....	Gasoline launch.....	<i>Long tons.</i> 34.60	<i>Ft. in.</i> 62 5	<i>Ft. in.</i> 15 0	<i>Ft. in.</i> 7 6	1918	Morehead City, N. C.
John Krey.....	do.....	7.00	35 5	8 0	5 0	1913	Muskegon, Mich.....
Rocks.....	Tugboat.....	5.00	26 0	7 3	4 0	1913	Southport, N. C.....
Sunshine.....	Quarter boat.....	12.00	47 6	11 6	3 0	1890	Smyrna, N. C.....
Beaufort.....	do.....	15.00	50 0	18 3	2 8	1908	.....
Quarterboat No. 4.....	do.....	16.00	53 0	15 0	2 9	.....	New River, N. C.....
Scows D and E.....	Dump scow.....	135.00	91 8	26 0	10 0	1907	Jacksonville, N. C.....
Scows F and G.....	do.....	225.00	125 0	32 0	10 0	1908	Baltimore, Md.....
Scow L.....	Deck scow.....	20.00	30 0	16 0	4 0	1912	Newbern, N. C.....
Scow 1 (one).....	do.....	60.00	75 0	20 0	5 0	1896	Wilmington, N. C.....
Scow 2.....	do.....	60.00	75 0	20 0	5 0	1896	do.....
Scow 3.....	do.....	65.00	75 8	20 0	5 6	1903	do.....
Scow 4.....	do.....	65.00	75 8	20 0	5 6	1903	do.....
Scows 5 and 6.....	do.....	65.00	75 8	20 6	5 6	1907	do.....
Scows 7 and 8.....	do.....	15.00	30 0	15 0	4 0	1903	Newbern, N. C.....
Scow 9.....	do.....	65.00	74 6	20 6	5 6	1913	Wilmington, N. C.....
Scow C.....	do.....	130.00	84 8	26 0	10 3	1897	do.....
Scow B-10.....	do.....	60.00	70 0	20 6	6 0	1912	Jacksonville, Fla.....
Scow B-11.....	do.....	65.00	74 0	24 6	6 0	1912	do.....
Scow 11.....	do.....	55.00	71 0	23 0	6 6	1913	Wilmington, Del.....

¹ For two.
² Repairs to Scow D.

³ Repairs to Scow F.
⁴ Repairs to Scow 5.

ed in the Engineer Department at large on Dec. 31, 1916—Continued.

WILMINGTON, DEL.—Continued.

Purchased.						
Where.	Material.	First cost.	Estimated value.	Condition.	Cost of repairs, additions, and rebuilding during calendar year.	Work to which belonging.
Forehead City, N. C.	Wood.	\$10,129.06	\$12,000.00	Excellent.	\$663.02	Improving rivers and harbors, Newbern, N. C., subdistrict.
Muskegon, Mich.	do.	2,525.00	1,800.00	Good.		Improving Cape Fear River, N. C., above Wilmington.
Southport, N. C.	do.	300.00	200.00	Fair.	38.28	Improving Cape Fear River, N. C., at and below Wilmington.
	do.	400.00	25.00	Poor.		Improving rivers and harbors, Newbern, N. C., subdistrict.
	do.	400.00	35.00	do.		Do.
Wilmington, N. C.	do.	650.00	100.00	do.		Improving Cape Fear River, N. C., above Wilmington.
	do.	16,500.00	(D2,500.00 E3,000.00)	Fair.	* 62.37	Improving Cape Fear River, N. C., at and below Wilmington.
	do.	30,650.00	10,000.00	do.	* 37.83	Do.
	do.	500.00	350.00	do.		Improving Beaufort Inlet, N. C.
	do.	1,000.00	250.00	Poor.		Improving Cape Fear River, N. C., above Wilmington.
	do.	1,000.00	350.00	do.	23.51	Improving Cape Fear River, N. C., at and below Wilmington.
	do.	1,485.00	450.00	Fair.	306.11	Do.
	do.	1,485.00	500.00	do.		Do.
	do.	4,450.00	1,400.00	do.	{ * 143.57 * 204.69 }	Do.
	do.	800.00	100.00	Poor.		Improving rivers and harbors, Newbern, N. C., subdistrict.
	do.	2,484.62	2,484.62	Good.		Improving Cape Fear River, N. C., above Wilmington.
	do.	5,020.00	1,500.00	Fair.		Improving Cape Fear River, N. C., at and below Wilmington.
Wilmington, N. C.	do.	(7)	1,000.00	do.	102.34	Do.
do.	do.	(7)	1,000.00	do.	102.34	Do.
Newbern, N. C.	do.	(8)	2,000.00	do.	34.00	Improving rivers and harbors, Newbern, N. C., subdistrict.

* Repairs to Scow 6.

* Included in cost of dredge Croatan.

7 Included in cost of Henry Bacon.

TABLE IV.

SEAGOING HOPPER DREDGES.

3981

TABLE IV.—Operations of seagoing dredges for the calendar year ending Dec. 31, 1916.

Name.....	Atlantic.	Atlantic.
1. District to which dredge belongs.....	Wilmington, Del.	Second New York.
2. Where built.....	Baltimore, Md.	Sparrows Point, Md.
3. When built.....	1914.....	1904-5.....
4. Builder.....	Ellicott Machine Corporation.....	Maryland Steel Co.
5. Contract cost.....	\$174,137.78.....	\$304,000.
6. Cost of outfit.....	\$4,811.46.....	\$17,577.94.
7. Total first cost.....	\$178,949.24.....	\$321,500 (Includes changes while building).
8. Present value.....	\$178,949.24.....	\$200,000.
9. Time to build.....	14 months 20 days.....	20 months.
10. Material of hull.....	Steel.....	Steel.
11. Length overall.....	161 feet 10 inches.....	288 feet.
12. Length between perpendiculars.....	150 feet.....	274 feet.
13. Beam.....	46 feet 6 inches.....	47 feet 6 inches.
14. Depth amidship.....	12 feet.....	25 feet.
15. Draft, light: (a) Forward.....	5 feet 4 inches.....	10 feet.
(b) Aft.....	7 feet 8 inches.....	12 feet.
16. Drafts, loaded: (a) Forward.....	10 feet.....	18 feet.
(b) Aft.....	9 feet 9 inches.....	20 feet.
17. Displacement: (a) Light.....	580 tons.....	2,670 tons.
(b) Loaded.....	994 tons.....	5,670 tons.
18. Number of hoppers.....	2.....	2.
19. Total capacity of hoppers.....	300 cubic yards.....	2,476 cubic yards.
20. Number of drags.....	1.....	2.
21. Type of drag.....	Standard cast steel.....	Ambrose Channel special design.
22. Number, size, and type of— (a) Dredging pumps.....	One 15-inch centrifugal.....	Two 20-inch centrifugal.
(b) Pumping engines.....	One 12 and 34 by 14 inch stroke, compound.....	Two 16 and 32 by 18 inch compound.
23. Revolutions per minute of pumping engines.....	175.....	160-170.
24. Total indicated horsepower of pumping engines.....	300.....	616 on test, Oct. 11, 1910; steam 112 pounds.
25. Number, size, and type of propelling engines.....	Two 12 and 2 by 14 inch stroke, compound.....	Two 22 and 44 by 30 inch compound.
26. Revolutions per minute of propelling engines: (a) Light.....	120.....	110.
(b) Loaded.....	115.....	100.
(c) While dredging.....	40.....	0-50 or more.
27. Total indicated horsepower of propelling engines.....	550.....	1,412 with steams at 113 pounds.
28. Average speed: (a) Light.....	9 knots.....	10 knots.
(b) Loaded.....	8 knots.....	8-9 knots.
(c) While dredging.....	2 knots.....	0-3 knots.
29. Number and type of boilers.....	2 Almy water tube boilers, class E.....	4 Scotch marine.

OPERATIONS.	OPERATIONS.		OPERATIONS.	
	Cold Spring Inlet, N. J.	Abasco Inlet, N. J.	Gowanus Bay, Red Hook Channel, 1 month; Jamaica Bay, Entrance Channel, 4 months.	New London Harbor, Conn.
31. Location of dredging.....				
35. Depth at mean low water before dredging.....	18 to 20 feet.	14.5 feet.	Gowanus Bay, 32 feet to 38 feet; Jamaica Bay, 3 feet to 18 feet.	25 to 33 feet.
36. Depth at mean low water after dredging.....	26 feet.	15 feet.	Gowanus Bay, 32 feet to 40 feet; Jamaica Bay, 3 feet to 19 feet.	Examination not completed.
37. Character of dredged material.....	Sea sand.	Sea sand.	Gowanus Bay, sand, 60 per cent; mud, 40 per cent; Jamaica Bay, fine sand.	Mud; small quantity of sand and gravel.
38. Total number of miles run by dredges from work to dump, while loaded only, during year.....	377.9	801	2,069	875.
39. Total number of loads dredged during year.....	378	635	324	328
40. Average distance from work to dump per load.....	0.969 mile.	1.26 miles.	8.385 miles.	2.1 miles.
41. Average number of loads dredged daily.....	4.5	5.99	2.4	4.05.
42. Maximum amount in cubic yards dredged in one day.....	3,280	5,510	6,298	8,031.
43. Maximum amount in cubic yards per load.....	330	330	2,395	1,932
44. Average amount in cubic yards per load.....	319.9	317.9	1,223.4	1,596.
45. Average amount in cubic yards dredged per hour pumping—Item 47, Item 54a.....	239.3	365.56	463.64	379.
46. Maximum amount in cubic yards dredged per hour pumping.....	360	562.5	607	548.
47. Total amount in cubic yards dredged during year.....	322,800 (120,925 cubic yards Cold Spring Inlet).	201,875	395,261	454,462.
48. Maximum amount in cubic yards dredged in one month.....	30,470	47,470	114,603	150,054.
49. Total amount in cubic yards dredged by this dredge in this locality.....	120,925	413,935	Gowanus Bay, 859,081; Jamaica Bay, 536,482.	454,462.

TABLE IV.—Operations of seagoing dredges for the calendar year ending Dec. 31, 1916—Continued.

Name	Abecon.						Atlantic.					
	Hours.	Minutes.	Percent- age.	Hours.	Minutes.	Percent- age.	Hours.	Minutes.	Percent- age.	Hours.	Minutes.	Percent- age.
DISTRIBUTION OF TIME AND VALUE OF LOST TIME.												
50. Time at work:												
(a) Pumping.....	505	19	15.04	552	14	10.18	846	15	13.16	1,199	25	51.00
(b) Turning in cut.....	97	46	2.91	150	3	2.77	43	30	2.69	76	10	3.22
(c) To and from dump.....	67	37	2.01	146	26	2.69	508	36	7.91	218	10	2.28
(d) Pumping.....	122	34	5.64	268	30	4.96	56	10	3.57	122	10	5.15
(e) Tacking fuel and supplies.....	180	26	5.37	128	3	2.36	222	35	3.47	96	40	2.99
(f) To and from wharf and anchorage.....	119	49	3.55	128	3	2.36	58	15	1.37	11	15	1.50
51. Time lost from work:												
(a) Bad weather.....	515	15	15.34	1,202	15	22.17	96	35	1.50	68	15	2.90
(b) Ordinary repairs.....	110	25	3.29	99	50	1.84	74	35	1.16	36	30	1.56
(c) Extraordinary repairs.....												
(d) Alterations and additions.....												
(e) Out of commission.....												
(f) Lying at berth nights and after work- ing hours.....	1,114	40	33.19	1,820	27	33.56	827	10	12.86	90	30	3.85
(g) Transferring from one district to an- other.....												
(h) Miscellaneous.....	82	45	2.47	141	10	2.60				17	30	.75
(i) Sundays and holidays.....	543	40	16.19	864		15.93	1,056		16.42	71	50	3.06
52. Total number of hours in year.....	8,784		100.00	8,784		100.00	8,784		100.00	8,784		100.00
53. Total time at work.....	993	15		1,279	23		1,767			1,683	25	71.57
54. Total time lost from work exclusive of Sun- days, holidays, and transfers, item [51- (g+h)].....	1,823	5		3,280	37		3,609			267	5	13.69
55. Number of days upon which any dredging was done.....	84			106			114			81		
56. Average number of working hours per day.....	11 hours 50 minutes.			12 hours 4 minutes.			45 hours 30 minutes.			20 hours 47 minutes.		
57. Maximum number of working hours per day.....	19 hours 10 minutes.			23 hours 30 minutes.			24 hours.			24 hours.		
58. Average time to dredge one load.....	1 hour 20 minutes.			52 minutes.			2 hours 37 minutes.			3 hours 40 minutes.		
59. Average time to dump one load.....	3.54 minutes.			3.24 minutes.			10 minutes.			22 minutes.		
60. Average time spent going to and from dump.....	11 minutes.			13 minutes.			1 hour 34 minutes.			40 minutes.		

DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.

61. Pay roll.....	\$7,431.49	45.08	\$10,812.53	41.16	\$20,398.72	32.97	\$9,831.70	22.27
62. Coal.....	4,048.74	24.64	5,155.70	19.67	13,807.09	22.32	17,144.62	38.83
63. Fuel oil.....	36.30	.22			233.72	.38	261.23	.69
64. Water.....								
65. Supplies:								
a. Subistence.....	1,952.69	11.84	3,377.24	12.86	5,977.01	9.66	2,673.00	6.06
b. Engine room.....	564.78	3.42	649.26	2.47	912.52	1.47	675.86	1.54
c. Miscellaneous.....	272.15	1.65	643.13	2.45	1,185.85	1.92	570.37	1.29
66. Renewals of or additions to outfit.....	110.45	.67	277.98	1.05	321.28	.52	458.89	1.01
67. Ordinary repairs:								
a. Hull.....	291.14	1.76	26.87	.11	632.42	1.02	155.00	.33
b. Machinery.....			213.49	.81				
68. Extraordinary repairs:								
a. Hull.....	46.00	.27	386.85	1.47				
b. Machinery.....			1,350.92	5.14				
69. Alterations and additions:								
a. Hull.....			247.68	.94				
b. Machinery.....			121.74	.46				
70. Laundry and miscellaneous expenses, wharfage, etc.....	300.00	2.17	583.80	2.23	599.43	.97	53.56	.12
71. Office expense.....	97.50	.58	1,025.47	3.90	2,711.76	4.38	240.05	.54
72. Surveys and superintendence.....	1,269.97	7.70	691.78	2.63	631.86	1.02	1,166.74	2.64
73. Rental.....			695.26	2.65	14,400.00	23.37	10,930.46	24.75
Total cost.....	16,481.81	100.00	26,264.70	100.00	61,871.66	100.00	44,161.48	100.00
74. Operating cost for year.....	\$14,777.20		\$22,196.90		\$44,067.48		\$42,590.69.	
75. Cost per hour of time at work (cents). Item 74 ÷ Item 53.....	\$14.88		\$17.35		\$24.94		\$25.30	
76. Value of time lost (exclusive of Sundays, holidays and transfer). Item 75 × Item 54.....			\$56,918.58		\$90,008.46		\$6,757.21.	
77. Cost per cubic yard based on cost per hour of time at work (cents). Item 75 ÷ Item 45.....	12.2		11		11.13		9.35	
78. Average number of cubic yards dredged per hour of time at work—Item 47 ÷ Item 53.....	121.7		157.7		224.26		270	
79. Cost per cubic yard with no repairs or additions (cents). [Total cost—(Items 67+68+69)] ÷ Item 47.....	13.4		11.8		15.45		9.68	
80. Cost per cubic yard with ordinary repairs (cents). [Total cost—(Items 68+69)] ÷ Item 47.....	13.5		11.9		15.61		9.72	
81. Gross cost per cubic yard (cents). Total cost ÷ Item 47.....	13.6		13		15.61		9.72	
82. Total cost per yard-mile (cents).....	13.6		10.3		2.44		3.64	

TABLE IV.—Operations of seagoing dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Absecon	Atlantic	Remarks.
MISCELLANEOUS.			
83. Fuel consumed during year (long ton or barrel).....	720.4 long tons.....	1,218.07 tons.....	2,539 long tons.
84. Average cost of fuel per long ton (or barrel).....	\$5.62.....	\$3.20+.....	\$6.79.
85. Fuel consumed per yard of dredged material.....	13.3.....	23.58+.....	1,261.
86. Cost of water per 1,000 gallons.....	15 cents.....	Supplied free.....	40 cents.
87. Water purchased during year.....	244,000 gallons.....	Do.....	653,077 gallons.
88. Total mileage of dredge during year.....	2,892 miles; 2,430 miles Absecon Inlet; total for year, 6,322 miles.	2,430 miles.....	4,100 miles.
	Remarks. Includes Absecon Inlet, N. J. The channel has been increased in depth from a minimum depth of 15 feet to a general depth of between 20 and 22 feet, over a width of 400 feet and a length of about 1,000 feet. Present sand pump 22 months old; will probably run about 6 months more without new liners. The dredge was docked in Wilmington, Del., for general repairs, February, 1916, and remained in dock for 90 hours 50 minutes. The extraordinary repairs to hull were made while in dry dock and include cleaning, painting, riveting, etc., and those to machinery include repairs to draghead, propeller, boiler parts, valves, crank shaft, etc.		
	Remarks. The U. S. Absecon was transferred Aug. 14, 1916, to Cold Spring Inlet, N. J., on authority Chief of Engineers, dated Nov. 22, 1915 (E. D.—8987/283). The channel has been increased to a general depth of 12 feet, over a width of 300 feet and to a length of about 2,400 feet. The dredge was docked in Wilmington, Del., for general repairs, February, 1916, and remained in dock for 90 hours 50 minutes. The extraordinary repairs to hull were made while in dry dock and include cleaning, painting, riveting, etc., and those to machinery include repairs to draghead, propeller, boiler parts, valves, crank shaft, etc.	4,173 long tons..... 23.58+..... 20 cents..... 1,083,600 gallons..... 6,500 miles.....	Dredge was transferred to the New London district at 12.01 a. m., Sept. 25, 1916; arrived at New London at 5.30 p. m.

1. District to which dredge belongs.....	New Orleans, La.	Cleveland, Ohio.
2. Where built.....	Richmond and Norfolk, Va.	Sparrows Point, Md.
3. When built.....	1900-1904	1906.
4. Builder.....	Wm. R. Trigg Co., Richmond, Va., and Norfolk Navy Yard.	Maryland Steel Co.
5. Contract cost.....	\$285,605	\$165,000.
6. Cost of outfit.....	\$127,633.37, including finishing at Norfolk, due to failure of Trigg Co.	\$19,300.
7. Total first cost.....	\$414,238.37	\$184,300.
8. Present value.....	\$230,000	\$150,000.
9. Time to build.....	4 years.	1 year 4 months.
10. Material of hull.....	Steel.	Steel.
11. Length over all.....	271 feet 6 inches	177 feet.
12. Length between perpendiculars.....	200 feet.	166 feet.
13. Beam.....	47 feet 6 inches.	38 feet.
14. Depth amidship.....	23 feet.	19 feet.
15. Drafts, light: (a) Forward.....	11 feet 2 inches.	8 feet 10 inches.
(b) Aft.....	12 feet 6 inches.	11 feet.
16. Drafts, loaded: (a) Forward.....	19 feet.	17 feet 6 inches.
(b) Aft.....	20 feet 6 inches.	17 feet 3 inches.
17. Displacement: (a) Light.....	2,978 tons.	1,510 tons.
(b) Loaded.....	5,436 tons.	2,795 tons.
18. Number of hoppers.....	2.	2.
19. Total capacity of hoppers.....	2,214 cubic yards.	935 cubic yards.
20. Number of drags.....	2.	2.
21. Type of drag.....	Grating type.	Flat grillage.
22. Number, size, and type of— (a) Dredging pumps.....	Two 20-inch centrifugal.	Two 15-inch centrifugal.
(b) Pumping engines.....	Two 16 and 32 by 20 inch, compound.	Two 12 and 22 by 14 inch, compound.
23. Revolutions per minute of pumping engines.....	150.	200.
24. Total indicated horsepower of pumping engines.....	738.	334.5.
25. Number, size, and type of propelling engines.....	2 compound, 20 and 40 by 30 inch.	2 vertical compound, 15 and 30 by 24 inch.
26. Revolutions per minute of propelling engines: (a) Light.....	140.	106.
(b) Loaded.....	130.	96.
(c) While dredging.....	Variable.	10 to 115.
27. Total indicated horsepower of propelling engines.....	1,500.	745.9.
28. Average speed: (a) Light.....	9.5 knots.	7 knots.
(b) Loaded.....	7.5 knots.	3.5 to 5.5 knots.
(c) While dredging.....	1 to 5 knots.	1.5 knots.
29. Number and type of boilers.....	4 Scotch marine.	2 single-ended Scotch.

TABLE IV.—Operations of seagoing dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....		Bryansd.		Burton.								
30. Dimensions of boilers:		13 feet 6 inches.....		13 feet.....								
(a) Diameter.....		10 feet.....		12 feet.....								
(b) Length.....		10,528 square feet.....		4,124 square feet.....								
(c) Heating surface (total).....		290 square feet.....		126 square feet.....								
(d) Grate surface (total).....		120 pounds.....		Average, 120 pounds; maximum, 132 pounds.								
31. Boiler pressure (guage).....		51.....		28.....								
32. Number of men in crew.....		51.....		28.....								
33. Number of men required to operate dredge with single crew.....		51.....		28.....								

FLOATING PLANT.

3989

50. Time at work:	1,611	5	18.3	991	20	11.3
(a) Pumping.....	77	5	9	.....	.....	.....
(b) Turning in cut.....	566	35	6.4	359	30	4.1
(c) To and from dump.....	217	45	2.5	.....	.....	.....
(d) Dumping.....	480	50	5.5	66	30	.8
(e) Taking fuel and supplies.....	491	35	5.6	70	15	.8
(f) To and from wharf and anchorage.....						
51. Time lost from work:	458	40	5.2	146	25	1.7
(a) Bad weather.....	10	55	1	108	40	1.3
(b) Ordinary repairs.....	1,161	45	13.2	119	15	1.4
(c) Extraordinary repairs.....						
(d) Alterations and additions.....						
(e) Out of commission.....						
(f) Lying at berths nights and after working hours.....	2,244	55	25.6	5,870	5	67.0
(g) Transferring from one district to another.....						
(h) Miscellaneous.....	373	55	4.3	8	30	.1
(i) Sundays and holidays.....	1,088	55	12.4	131	30	1.5
52. Total number of hours in year.....	8,784		100.0	8,784		100.0
53. Total time at work.....	3,444	55	39.2	1,487	35	.....
54. Total time lost from work (exclusive of Sundays, holidays, and transfers). Item [51 - (g+h)].....	4,250	10	48.4	6,375	55	.....
55. Number of days upon which any dredging was done.....	211					106
56. Average number of working hours per day.....	16.20					8 hours 55 minutes.
57. Maximum number of working hours per day.....	24					14 hours 35 minutes.
58. Average time to dredge one load.....	1 hour 17 minutes					3 hours 10 minutes.
59. Average time to dump one load.....	10 minutes					No delay.
60. Average time spent going to and from dump.....	26 minutes					45 minutes.

TABLE IV.—Operations of seagoing dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Emysard.		Burton.	
	Amount.	Percentage.	Amount.	Percentage.
DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.				
61. Pay roll.....	\$21,647.77	35.6	\$22,132.48	46.2
62. Coal.....	26,285.10	29.5	7,112.07	14.8
63. Fuel oil.....				
64. Water.....				
65. Supplies:				
(a) Subistence.....	9,745.36	11.0	5,040.03	10.6
(b) Engine room.....	2,612.10	3.0	1,066.48	2.2
(c) Miscellaneous.....	3,678.17	4.2	663.43	1.4
66. Renewals of or additions to outfit.....	462.61	.5	2,346.22	4.9
67. Ordinary repairs:				
(a) Hull.....			597.79	1.1
(b) Machinery.....			1,280.32	2.7
68. Extraordinary repairs:				
(a) Hull.....				
(b) Machinery.....	2,744.72	3.0	1,428.54	3.0
69. Alterations and additions:				
(a) Hull.....	7,916.24	8.9	1,178.06	2.5
(b) Machinery.....			418.80	.8
70. Laundry and miscellaneous expenses, wharfage, etc.....	211.29	.2	428.56	.9
71. Office expense.....	2,967.20	3.3	774.99	1.5
72. Surveys and superintendence.....	760.00	.8	1,200.00	2.5
73. Rental.....			2,300.00	4.8
Total cost.....	85,982.56	100.0	47,810.76	100.0
74. Operating cost for year.....	\$74,594.40.			
75. Cost per hour of time at work. Item 74+Item 53.....	\$21.65.....		\$30,067.70.	
76. Value of time lost (exclusive of Sundays, holidays, and transfer). Item 75XItem 64.....	\$92,012.50.....		\$26,262.....	
77. Cost per cubic yard based on cost per hour of time at work (cents). Item 75+Item 76.....	\$0.069.....		\$167,444.233.....	

do.	dusky.	land.	port.	bul.	neut.	late.	trict.
368.....	200	306	145	219	98	217	206
6.1.....	11.8	12.5	19.4	16.6	25.8	13.8	13.8
6.1.....	12.3	12.9	20.2	17.3	26.9	14.3	14.4
7.....	13.3	14.0	21.8	18.7	29.0	15.4	15.5
2.5.....	10.9	7.0	43.6	25.6	29.0	6.9	12.5

MISCELLANEOUS.

78. Average number of cubic yards dredged per hour of time at work—Item 47+Item 53.	
79. Cost per cubic yard with no repairs or additions (cents). [Total cost—(Items 67+68+69)+Item 47.]	
80. Cost per cubic yard with ordinary repairs (cents). [Total cost—(Items 68+69)+Item 47.]	
81. Gross cost per cubic yard (cents). Total cost+Item 47.	
82. Total cost per yard mile (cents).....	

6,770 long tons.....	2,150.
\$3.87½ long ton.....	3.69.
11.9.....	16
6,182 miles.....	3,822.

Remarks.

(At the beginning of the fiscal year the available depth in channel in Southwest Pass was 28 feet, with a minimum depth of 100 feet. At the end of the period covered by this report the available depth was 28 feet. The total yardage necessary to be removed to secure the project channel of 35 feet by 1,000 feet was 7,250,000 cubic yards at the beginning of this report and 4,350,000 cubic yards at the end of the period. The extraordinary repairs consisted of purchase of 6 lengths of steel pipe, repairs to win gates, etc., and repairs of machinery and painting part of hull. The dredge was docked once during the period and remained in dock from July 11 to August 25, 1913. Age of present sand pump is two and one-half years. The pump will run one year without new liners.

Remarks.

1. Sand, mud, and clay.
2. Includes navigation closed by ice.

TABLE IV.—Operations of seagoing dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Cape Fear.	Catawba.	Charleston.
1. District to which dredge belongs.....	Wilmington, N. C.	Montgomery Ala.	Mobile, Ala.
2. Where built.....	Philadelphia, Pa.	Greensport, L. I.	Brooklyn, N. Y.
3. When built.....	1886.	1905.	1891.
4. Builder.....	Chas. Hillman Ship & Engine Building Co.	James Reilly Repair & Supply Co.	Henry Lawrence.
5. Contract cost.....	\$65,780.	\$150,000.	\$35,000.
6. Cost of outfit.....	\$5,028.30.	\$20,000.	\$4,000 (approximate).
7. Total first cost.....	\$60,808.30.	\$170,000.	\$39,000.
8. Present value.....	\$42,000.	\$100,000.	\$30,000.
9. Time to build.....	9 months.	2 years 7 months.	9 months.
10. Material of hull.....	Wood.	Wood.	Oak frames, oak and pine planking.
11. Length over all.....	131 feet 3 inches.	200 feet.	122 feet 6 inches.
12. Length between perpendiculars.....	113 feet 9 inches.	185 feet.	117 feet.
13. Beam.....	29 feet.	41 feet.	30 feet.
14. Depth amidship.....	12 feet.	23 feet 2 inches.	12 feet.
15. Draft, light: (a) Forward.....	11 feet.	13 feet 6 inches.	10 feet 8 inches.
(b) Aft.....	15 feet.	14 feet 6 inches.	12 feet 1 inch.
16. Drafts, loaded: (a) Forward.....	15.3.	19 feet 6 inches.	15 feet 5 inches.
(b) Aft.....	16.3.	14 feet 6 inches.	17 feet 1 inch.
17. Displacement: (a) Light.....	480 tons.	1,980 tons.	800 tons.
(b) Loaded.....	870 tons.	3,180 tons.	1,100 tons.
18. Number of hoppers.....	1.	2.	2.
19. Total capacity of hoppers.....	300 cubic yards.	977 cubic yards.	312.
20. Number of drags.....	2.	2.	1.
21. Type of drag.....	Scraper type.	Allen.	Ordinary.
22. Number, size, and type of— (a) Dredging pumps.....	Two 10-inch centrifugal.	Two 18-inch centrifugal.	One 15-inch centrifugal, Edward make.
(b) Pumping engines.....	Two 10½ inches diameter by 10½ inch stroke.	Two 14 and 26 by 18 inches compound.	One fore and aft compound, 13 by 23 by 14 inch stroke.
23. Revolutions per minute of pumping engines.....	245.	185.	225.
24. Total indicated horsepower of pumping engines.....	175.	670.	250.
25. Number, size, and type of propelling engines.....	One 15 and 30 by 24 inches compound.	One 22 and 44 by 30 inches compound.	One, size 17 by 23 by 23 inches, steepie compound.
26. Revolutions per minute of propelling engines: (a) Light.....	120.	88.	120.
(b) Loaded.....	115.	83.	110.
(c) While dredging.....	From 70 to 115.	72.	75.
27. Total indicated horsepower of propelling engines.....	390.	725.	360.

No.	Description	Pensacola Harbor, Fla.	Southwest Pass, Mississippi River.	Mobile Bar, Ala.	St. Andrews Bay, Fla.
29.	Number and type of bolters.	(a) Cape Fear River, below Wilmington, N. C., and (b) Beaufort Inlet, N. C.			
30.	Dimensions of bolters:				
	(a) Diameter.	12 feet 6 inches.	14 feet.	13 feet.	13 feet.
	(b) Length.	11 feet 4 inch.	12 feet.	12 feet.	12 feet.
	(c) Heating surface (total).	1,800 square feet.	5,473 square feet.	1,775 square feet.	1,775 square feet.
	(d) Grate surface (total).	61 square feet.	147 square feet.	72 square feet.	72 square feet.
31.	Boiler pressure (gauge).	115 pounds.	120 pounds.	100 pounds.	100 pounds.
32.	Number of men in crew.	35.	36.	27.	27.
33.	Number of men required to operate dredge with single crew.	17.	36.	18.	18.
OPERATIONS.					
34.	Location of dredging.	(a) Cape Fear River, below Wilmington, N. C., and (b) Beaufort Inlet, N. C.			
35.	Depth at mean low water before dredging.	10 to 30 feet.	27 to 30 feet; on edges only.	27 to 30 feet.	13 feet.
36.	Depth at mean low water after dredging.	10 to 30 feet.	Project depth nearly restored.	28 to 30 feet.	22 feet.
37.	Character of dredged material.	Sand, mud, clay, shells, and debris.	Sand, silt, and mud.	98 per cent sand, 2 per cent mud.	Sand, shells, clay, and mud.
38.	Total number of miles run by dredges from work to dump, while loaded only, during year.	4,802 miles.	678.	105.5.	1,514.5.
39.	Total number of loads dredged during year.	2,577.	264.	253.	1,020.
40.	Average distance from work to dump per load.	1.86 + miles.	2.25 miles.	0.417 miles.	1.48 miles.
41.	Average number of loads dredged daily (counting days worked).	9.17.	4.23.	7.23.	7.669.
42.	Maximum amount in cubic yards dredged in one day.	5,261.	4,840.	3,358.	3,400.
43.	Maximum amount in cubic yards per load.	315.	970.	312.	312.
44.	Average amount in cubic yards per load.	299.	920.62.	295.09.	297.8.
45.	Average amount in cubic yards dredged per hour pumping—Item 47 + Item 50a.	247.	794.	390.53.	381.6.
46.	Maximum amount in cubic yards dredged per hour pumping.	528.	1,356.	621.4.	685.
47.	Total amount in cubic yards dredged during year.	(a) 667,866; (b) 104,487; total, 772,353.	245,027.	74,657.0.	303,240.
48.	Maximum amount in cubic yards dredged in one month.	75,885.	85,637.	30,390.0.	60,577.
49.	Total amount in cubic yards dredged by this dredge in this locality.	(a) 7,760,000; (b) 1,259,888.	4,024,957.	74,657.0 (during year).	303,240.

TABLE IV.—Operations of seagoing dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Cape Fear.				Ocruea.				Charleston.			
	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Hours.	Minutes.	Percentage.	Hours.
DISTRIBUTION OF TIME AND VALUE OF LOST TIME.												
50. Time at work:												
a. Pumping.....	3, 124	30	33.57	286	16	6.98	921	43	191	10	4.60	797
b. Turning in cut.....	506	50	5.77	171	38	4.18	155	35	45	04	1.09	327
c. To and from dump.....	1, 335	28	15.20	171	38	4.18	433	03	28	33	6.69	84
d. Dredging.....	214	50	2.45	53	50	1.29	104	12	26	38	3.93	37
e. Towing (fuel and supplies).....	533	35	6.07	53	50	1.29	152	26	38	38	3.93	37
f. To and from wharf and anchorage.....	242	26	2.76	292	28	7.12	58	35	127	11	3.06	278
51. Time lost from work:												
a. Bad weather.....	727		8.28	152	31	3.72	543	26	273	05	6.58	47
b. Ordinary repairs.....	568	05	6.47	160	9	3.90	266	18	127	49	3.06	110
c. Extraordinary repairs.....				144		3.51	24		768		18.50	
d. Alterations and additions.....				1, 056		25.73			840		20.23	
e. Out of commission.....												
f. Lying at berth nights and after working hours.....				1, 072	18	24.13	502	34	947	18	22.82	1, 659
g. Transferring from one district to another.....	85	45	.98	240		5.85	458	12	60	12	1.66	72
h. Miscellaneous.....	1, 446		16.45	384		9.26	531	55	606		16.76	720
i. Sundays and holidays.....												
52. Total number of hours in year.....	8, 784		100.00	8, 784		100.0	8, 784		8, 784		100.00	8, 784
53. Total time at work.....	5, 957	10	67.82	823	2	20.06	1, 825	35	430	36	10.37	1, 824
54. Total time lost from work (exclusive of Sundays, holidays, and transfers, item [51-(g+i)].....	1, 380	50	32.18	2, 894	56	65.93	1, 794	30	3, 026	24	72.57	2, 147
54. Number of days upon which any dredging was done.....	281			62			119		35			123
55. Average number of working hours per day.....	21 hours 12 minutes			11 hours 48 minutes			15 hours 19 minutes		13 hours 18 minutes			11 hours 28 minutes
56. Maximum number of working hours per day.....	24 hours			12 hours			24 hours		15 hours 40 minutes			12 hours 43 minutes
57. Average time to dredge one load.....	1 hour 12 minutes +			1 hour 5 minutes			1 hour 15 minutes		0.756 hours			46.92 minutes
58. Average time to dump one load.....	5 minutes			39 minutes			7 minutes		0.113 hours			4.93 minutes
59. Average time spent going to and from dump.....	31 minutes +			29 minutes			30 minutes		0.181 hours			19.26 minutes

DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.									
61. Pay roll.....	\$21,947.34	38.22	\$6,638.73	39.30	\$15,008.40	36.2	5,478.53	52.21	\$9,001.87
62. Coal.....	10,360.99	17.91	3,175.20	17.98	10,635.66	25.7	571.56	3.45	1,591.75
63. Fuel oil.....									
64. Water.....	76.80	.12	257.95	1.46			13.00	.12	215.94
65. Supplies:									
a. Subsistence.....	5,771.35	10.05	1,856.79	11.08	1,236.71	3	1,562.49	14.89	2,681.49
b. Engine room.....	515.83	.90	848.15	4.80	1,027.75	2.5	56.77	.54	916.03
c. Miscellaneous.....	428.65	.76	551.77	3.13	354.30	.9	63.73	.60	281.79
66. Renewals or additions to outfit.....	1,948.20	1.91	809.13	4.58	743.13	1.7	302.86	2.81	116.44
67. Ordinary repairs:									
a. Hull.....	938.18	1.61			62.00	.2	42.03	.40	283.67
b. Machinery.....	1,789.49	3.12	134.38	.76	70.68	.2	36.06	.34	242.15
68. Extraordinary repairs:									
a. Hull.....			1,107.43	6.27	359.50	.9	227.53	2.17	
b. Machinery.....							40.48	.38	
69. Alterations and additions:									
a. Hull.....									
b. Machinery.....									
70. Laundry and miscellaneous expenses, wharfage, etc.....	3,587.37	6.24	275.37	1.56	431.97	1	102.42	.98	336.57
71. Office expense.....	1,339.37	2.33	387.50	2.20	1,526.05	3.6	590.38	5.62	1,389.83
72. Surveys and superintendence.....	9,670.81	16.83	1,215.02	6.88	370.00	.9	392.04	3.73	3,679.24
73. Rental.....					9,625.00	23.2			17.48
Total cost.....	57,450.38	100.00	17,657.42	100.00	41,439.15		10,494.11	100.00	21,046.77
74. Operating cost for year.....	\$43,711.53		\$14,813.09		\$39,050.92		\$8,151.39		\$19,121.12
75. Cost per hour of time at work. Item 74 + Item 53.....	\$7.34		\$17.9996		\$21.39		\$18.93		\$12.54
76. Value of time lost (exclusive of Sundays, holidays, and transfer). Item 75 X Item 54.....	\$10,135.29		\$50,848.87		\$38,384.35		\$57,270.82		\$26,926.14
77. Cost per cubic yard based on cost per hour of time at work (cents). Item 75 + Item 78.....	5.68		6.046		5.7		10.9		6.306
78. Average number of cubic yards dredged per hour of time at work = Item 47 + Item 53.....	129.6		297.71		376		173.38		198.964
79. Cost per cubic yard with no repairs or additions (cents). [Total cost - (Items 67 + 68 + 69) + Item 47.....	7.09		6.699		5.9		12.23		6.763
80. Cost per cubic yard with ordinary repairs (cents). [Total cost - (Items 68 + 69) + Item 47.....	7.44		6.754		5.9		12.34		6.941
81. Gross cost per cubic yard (cents). Total cost + Item 47.....	7.44		7.206		6		14.06		6.941
82. Total cost per yard mile (cents).....	4		3.2026		2.86		33.72		4.69

TABLE IV.—Operations of seagoing dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Cape Fear.	Oceus.	Charleston.
MISCELLANEOUS.			
83. Fuel consumed during year (long ton or barrel).....	2,033.5 tons.....	1,114.13 tons.....	223 tons.....
84. Average cost of fuel per long ton (or barrel).....	\$5.05+ in bunkers.....	\$2.85 per ton.....	\$11.131 tons.
85. Fuel consumed per yard of dredged material in pounds—Item 83+Item 47.....	5.9.....	\$1.87+ per long ton.....	\$2.3322.
86. Cost of water per 1,000 gallons.....	\$1.81.....	5.9.....	\$6.917.
87. Water purchased during year.....	42,500 gallons.....	\$0.79479.....	8 cents (approximate).....
88. Total mileage of dredge during year.....	10,800.....	303,550 gallons.....	228,300 gallons.
	Remarks. There were no extraordinary repairs made during the year. Dredge was docked one time. Total time on dock, 3 days. The different parts of the sand pumps are of different ages: The shells are about 14 months, heads about 2 years, runners about 8 months. About 2 months.	Remarks. Hull: Replacing 1 new propeller blade; repairs to stern bearing; putting on 40 sheets of new copper. Machinery: None. One docking; 6 days in dock; 11 years. Probably 6 months. Re transferred from the New Orleans district on July 14, 1916. Left New Orleans for Pensacola July 31, 1916, arrived Pensacola Aug. 3, 1916. No accidents.	Remarks. No extraordinary repairs. No docking. The present sand pump has been in use for 3 years and 4 months. It has no liners. Dredge arrived at St. Andrews Bay Jan. 9, 1916. Commenced work Jan. 14, 1916. Stopped work July 3, 1916. Returned to Mobile, Ala., July 12, 1916. No accidents.

1. District to which dredge belongs.	Second Portland, Oreg.	Second Portland, Oreg.	Galveston, Tex.	Savannah, Ga.
2. Where built.	Belfast, Ireland.	Newport News, Va.	Baltimore, Md.	Belfast, Me.
3. When built.	1892.	1906.	1915.	1902.
4. Builder.	Harland & Wolfe.	Newport News Shipbuilding Co.	Ellisort Machine Corporation.	Geo. A. Gilchrist.
5. Contract cost.	(3)	\$234,500.	\$210,433.68.	\$144,750.1
6. Cost of outfit.	(3)		\$3,512.07.	\$13,700.12
7. Total first cost.	(3)		\$213,945.75.	\$158,450.12
8. Present value.	(3)			\$95,000.
9. Time to build.	(3)	1 year 4 months.		1 year and 1 month.
10. Material of hull.	Steel.	Steel.	Steel.	Wood.
11. Length over all.	400 feet.	180 feet.	163 feet.	200 feet.
12. Length between perpendiculars.	445 feet.	168 feet.	148 feet.	183 feet.
13. Beam.	49 feet.	38 feet.	35 feet.	40 feet 8 inches.
14. Depth amidship.	34 feet.	23 feet.	17 feet.	25 feet 6 inches.
15. Drafts, light:				
(a) Forward.	17 feet 6 inches.	12 feet.	7 feet 3 inches.	13 feet 5 inches.
(b) Aft.	do.	16 feet.	11 feet 6 inches.	14 feet 3 inches.
16. Drafts, loaded:				
(a) Forward.	24 feet.	22 feet 4 inches.	15 feet.	20 feet 5 inches.
(b) Aft.	do.	20 feet 4 inches.	14 feet 6 inches.	19 feet 5 inches.
17. Displacement:				
(a) Light.	7,400 tons.	1,360 tons.	660 tons.	1,905 tons.
(b) Loaded.	12,500 tons.	3,138 tons.	1,260 tons.	3,597 tons.
18. Number of hoppers.	2.	2.	2.	2.
19. Total capacity of hoppers.	3,500 cubic yards.	1,130 cubic yards.	490 cubic yards.	970.29 cubic yards.
20. Number of drags.	4.	2.	2.	2.
21. Type of drag.	New York, flat type.	New York, flat type.	Ambrose Channel.	1 special design, by Savannah Engineer office; 1 design, and patented by Nimrod Long.
22. Number, size, and type of—				
(a) Dredging pumps.	Two 20-inch centrifugal and two 30-inch centrifugal.	Two 18-inch centrifugal.	Two 15-inch centrifugal.	Two 18-inch centrifugal.
(b) Pumping engines.	Two 13 and 20 and 31½ by 20 inch triple expansion and two 17 and 27½ and 42 by 20 inch triple expansion.	Two 12 and 26 by 18 inch stroke, compound.	Two 11-inch and 22-inch by 11-inch vertical compound.	Two 14 and 26 by 16 inch stroke.
23. Revolutions per minute of pumping engines.	150.	152.	165.	190.
24. Total indicated horsepower of pumping engines.	2,000.	500.	450.	540, on trial with 120 pounds steam.
25. Number, size, and type of propelling engines.	Two 22½ and 36½ and 60 by 48 inch triple expansion.	One 20 and 44 by 30 inch stroke, compound.	One 18-inch and 36-inch by 24-inch vertical compound.	One, 22 and 44 by 30 inch compound.
26. Revolutions per minute of propelling engines:				
(a) Light.	70.	110.	120-124.	105.
(b) Loaded.	66.	100.	115-118.	79.
(c) While dredging.	55.	80.	90-95.	30 to 90.

TABLE IV.—Operations of seagoing dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Chinook.	Clatsop.	Ormatock.	Comberland.
27. Total indicated horsepower of propelling engines.....	3,300.	900.	650.	835.15, on trial Mar. 17, 1907, with 122 pounds steam and old propeller.
28. Average speed:	12 knots.	7 knots.	8 knots.	10 knots.
(a) Light.....	11 knots.	3 knots.	7 knots.	8 knots.
(b) Loaded.....	2 knots.	2 knots.	2 knots.	1 to 2 knots.
(c) While dredging.....	2 double-end and 2 single-end Scotch marine.	2 single-end, Scotch marine.	2, Scotch marine.	2 Scotch.
29. Number and type of boilers.....	14 feet 1 inch.	13 feet.	11 feet.	14 feet.
30. Dimensions of boilers:	Double end, 17 feet; single end, end, 9 feet 9 inches.	12 feet.	12 feet.	12 feet.
(a) Diameter.....	13.473 square feet.	3,942 square feet.	3,054 square feet.	6,000 square feet.
(b) Length.....	18 oil burners; 18 furnaces of 43 inches each.	6 oil burners; 6 furnaces of 44 inches each.	128 square feet.	136 square feet.
(c) Heating surface (total).....	145 pounds.	135 pounds.	150 pounds.	120 to 125 pounds.
(d) Grate surface (total).....	71.	40.	32.	36.
31. Boiler pressure (gauge).....	45.	30.	32.	36.
32. Number of men in crew.....				
33. Number of men required to operate dredge with single crew.....				
OPERATIONS.				
34. Location of dredging.....	Columbia River bar.	Lower Columbia River, Oreg. and Wash.	Port Aransas, Brazos River, and Port Bolivar, Tex.	Savannah Harbor.
35. Depth at mean low water before dredging.....	31½ feet.	21½ feet.	Port Aransas, 19 feet; Brazos River, 14 feet; Port Bolivar, 23 feet.	22 to 24 feet.
36. Depth at mean low water after dredging.....	37 feet.	Minimum, 28 feet; maximum, 30 feet.	Port Aransas, 21 feet; Brazos River, 19 feet; Port Bolivar, 24 feet.	22 to 27 feet.
37. Character of dredged material.....	Sand.	Sand.	Sand, silt, and mud.	Sand, shell, and mud.
38. Total number of miles run by dredge from work to dump, while loaded only, during year.....	1,048.71.	1,132.32.	006.5.	3,287.
39. Total number of loads dredged during year.....	550.	1,283.	1,042.	1,101.
40. Average distance from work to dump per load.....	1.917 miles.	0.9327 mile.	0.58 mile.	2.99 miles.
41. Average number of loads dredged daily (counting days worked).....	4.061.	10.18.	5.24.	4.30.
42. Maximum amount in cubic yards dredged in one day.....	17,870.	21,201.	4,410.	7,300.
43. Maximum amount in cubic yards per load.....	3,465.	1,181.	490.	970.3.
44. Average amount in cubic yards per load.....	2,462.2.	1,024.4.	460.	931.5.
45. Average amount in cubic yards dredged per	1,171.86.	960.51.		705.8.

47. Total amount in cubic yards dredged during year. 1,370,711. 289,960.
 48. Maximum amount in cubic yards dredged in 1 month. 347,625.
 49. Total amount in cubic yards dredged by this dredge in this locality. 7,666,078.

DISTRIBUTION OF TIME AND VALUE OF LOST TIME.

50. Time at work:

(a) Pumping. 1,169
 (b) Turning in out. 104
 (c) To and from dump. 151
 (d) Dumping. 76
 (e) Taking fuel and supplies. 78
 (f) To and from wharf and anchorage. 78

51. Time lost from work:

(a) Bad weather. 318
 (b) Ordinary repairs. 108
 (c) Extraordinary repairs. 83
 (d) Alterations and additions. 4,368
 (e) Out of commission. 973
 (f) Lying at berth nights and after working hours. 973
 (g) Transferring from one district to another. 715
 (h) Miscellaneous. 544
 (i) Sundays and holidays. 8,784

52. Total number of hours in year. 8,784

53. Total time at work. 1,672
 54. Total time lost from work (exclusive of Sundays, holidays, and transfers). Item (51-(g+i)). 6,567

55. Number of days upon which any dredging was done. 118

56. Average number of working hours per day. 14.172
 57. Maximum number of working hours per day. 16.33
 58. Average time to dredge one load. 2.128 hours
 59. Average time to dump one load. 8.245 minutes
 60. Average time spent going to and from dump. 16.491 minutes

Hours.	Minutes.	Percent- age.	Hours.	Minutes.	Percent- age.	Hours.	Minutes.	Percent- age.	Hours.	Minutes.	Percent- age.
1,169	40	13.316	1,363	10	15.5188	1,300	33	14.83	1,933	46	14.672
104	25	2.236	88	11	1.01	88	44	1.01	11	7	1.127
151	10	1.721	263	45	3.0277	245	55	3.94	780	21	8.884
76	30	.871	313	.06	2.4253	60	20	1.05	121	46	1.388
78	40	.886	87	25	1.9804	116	18	1.35	316	12	3.600
			155	35	1.7683	143	39	1.60	430	3	4.866
318	30	3.626	56		.6375	528	12	6.02	56	2	.688
108	45	1.238	120	35	1.4752	313	20	3.85	507	35	5.778
83	45	.942	400		4.5338	1,648		7.36	88	10	1.004
4,368		49.727	2,268		27.4317	1,384		4.38	2	30	.088
973	45	11.065	1,267	10	14.4253	(3)			3,667	26	41.751
715	50	8.149	600	50	6.8400	338	26	3.85			
544		6.193	960		10.9260	3,192	24	36.22	96	54	1.080
8,784		100.000	8,784		100.0000	1,286		14.75	1,419	10	16.153
1,672	25	2.082	2,082	25	2.085	8,784		100.00	8,784		100.000
6,567	35	5.741	5,741	35	6.085			23.79	2,948	15	33.865
									4,416	35	50.279

256.
 198.
 8.
 8.
 1 hour 15 minutes.
 1 hour 10.2 minutes.
 5 minutes 12 seconds.
 6.6 minutes.
 42.5 minutes.
 11 hours 31 minutes.
 12.
 1 hour 10.2 minutes.
 6.6 minutes.
 42.5 minutes.

TABLE IV.—Operations of seagoing dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.	Chinook.		Clatsop.		Comstock.		Cumberland.	
	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.
DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.								
61. Pay roll.....	\$32,851.49	25.253	\$20,728.15	34.649	\$23,285.51	29.66	\$22,814.11	33.922
62. Coal.....	313.20	.241	119.76	.200	200	.49	14,348.27	24.480
63. Fuel oil.....	40,115.19	30.837	12,832.51	21.452	15,334.00	19.53		
64. Water.....	92.50	.071	80.00	.134	451.14	.57		.414
65. Supplies:								
(a) Subistence.....	6,945.22	5.339	3,857.21	6.448	7,155.55	9.10	6,914.46	11.796
(b) Engine room.....	2,890.09	2.190	1,526.72	2.550	3,997.37	5.08	2,319.59	3.957
(c) Miscellaneous.....	2,119.08	1.639	1,123.92	1.879	4,107.76	5.22	1,679.98	2.895
66. Renewals of or additions to outfit.....	1,768.23	1.359	600.84	1.004	3,371.35	4.28	2,910.85	4.968
67. Ordinary repairs:								
(a) Hull.....	4,492.86	3.454	213.32	.357	262.22	.33	336.06	.573
(b) Machinery.....	2,812.92	2.162	1,017.75	1.701	604.59	.77	2,037.95	3.477
68. Extraordinary repairs:								
(a) Hull.....	12,190.61	9.370	4,200.40	7.072	3,283.60	4.06	1,379.05	2.353
(b) Machinery.....	6,784.50	5.215	2,605.35	4.355	4,264.13	5.40	394.25	.673
69. Alterations and additions:								
(a) Hull.....	8,509.40	6.541	231.94	.388	148.00	.19		
(b) Machinery.....	598.45	.460	753.89	1.310	6,000.21	7.63	599.40	1.023
70. Laundry and miscellaneous expenses, wharf, etc.	2,221.29	1.708	6,776.79	11.328	5,863.80	7.50	1,969.40	3.860
71. Office expenses.....	5,414.28	4.162	3,094.71	5.173			656.46	1.120
72. Surveyors and superintendence.....								
73. Rental.....								
Total cost.....	130,068.31	100.000	59,822.23		78,542.73	100.00	58,613.75	100.000
74. Operating cost for year.....	\$87,663.45		\$41,652		\$63,096.39		\$52,129.02	
75. Cost per hour of time at work. Item 74÷Item 53.....	\$52.4172		\$20.0176		\$30.23		\$17.98	
76. Value of time lost (exclusive of Sundays, holidays, and transfer). Item 75×Item 54.....	\$344,254.3116		\$114,932.7178		\$153,100		\$78,065.13	
77. Cost per cubic yard based on cost per hour of time at work (cents). Item 75÷Item 78.....	6.3655		3.0857		11.68		5.083	
78. Average number of cubic yards dredged per hour of time at work=Item 47÷Item 53.....	819.59		648.39		259		347.8	
79. Cost per cubic yard with no repairs or additions (cents). [Total cost—(Items 67+68+69)÷Item 47.....]	6.9625		3.8159		12.82		5.309	
80. Cost per cubic yard with ordinary repairs (cents). [Total cost—(Items 68+69)÷Item 47.....]	7.4655		3.9077		13.10		5.541	
81. Gross cost per cubic yard (cents). Total cost÷Item 47.....	9.4906		4.4306		14.52		6.715	
82. Total cost per yard mile (cents).....	4.9767		8.0182		26		1.996	

85. Fuel consumed per yard of dredged material in pounds—Item 85-1 Item 47.	0.3083.			
86. Cost of water per 1,000 gallons.	\$5 delivered by barge.			
87. Water purchased during year.	5,202 miles.			
88. Total mileage of dredge during year.				
	Remarks.			
	Renovals to bin gates, rods, gate rear, ball-and-socket joints and drag heads, and repairs to steering engine and stern winch, also installation of new 20-inch suction-pipe supports. Machinery. Renewals to parts of 20 and 30 inch pumps and engines, placing metallic packing on main engine rods and valve stems, and installing stay tubes in boilers. The dredge was docked once during the year for a period of two days. Present age of 20-inch sand pumps, 13 years; 30-inch, 3 years. Pumps will run without new liners for about 6 months when dredging 16 hours per day. The channel depth was increased from 31½ feet to 37 feet over an area 1,000 feet in width. 1 Formerly the United States transport Grant. 2 Transformed from transport to 20-inch dredge in 1903 by the Navy Department at a cost of \$217,724.47. Remodeled at Portland, Ore., in 1910 at an additional cost of \$157,073. Two additional pumps, 30-inch, with machinery and auxiliaries, were installed at Portland, Ore., in 1914 at a cost of \$107,588. 3 Transferred from Quartermaster's Department to Engineer Department, United States Army.			
	Remarks.			
	1 Vessel was out of commission while undergoing extraordinary repairs and alterations, and additions. 2 Given with miscellaneous. 3 Contained in Portland Depot charges of \$5,000.55. Dredge worked at Port Bolivar, mouth of Brazos River, and Port Aransas, Tex. Dredge docked at New Orleans, La., Feb. 5, 1916. On dock 5 days; extraordinary repairs, \$403.50. Dredge docked at Galveston, Tex., Sept. 29, 1916. On dock 9 days. Extraordinary repairs.... \$3,374.75 Docking and lay days.... 921.50 Pay rolls.... 2,701.34 Subsistence... 553.62 Miscellaneous supplies 2,250.15 9,807.36			
	Remarks.			
	1 Vessel was out of commission while undergoing extraordinary repairs and alterations, and additions. 2 Given with miscellaneous. 3 Contained in Portland Depot charges of \$5,000.55. Dredge worked at Port Bolivar, mouth of Brazos River, and Port Aransas, Tex. Dredge docked at New Orleans, La., Feb. 5, 1916. On dock 5 days; extraordinary repairs, \$403.50. Dredge docked at Galveston, Tex., Sept. 29, 1916. On dock 9 days. Extraordinary repairs.... \$3,374.75 Docking and lay days.... 921.50 Pay rolls.... 2,701.34 Subsistence... 553.62 Miscellaneous supplies 2,250.15 9,807.36			

TABLE IV.—Operations of seagoing dredges for the calendar year ending Dec. 31, 1916.

Name.....		Delaware.		Galveston.	
1. District to which dredge belongs.....		Philadelphia, Pa.	Galveston, Tex.		
2. Where built.....		Sparrows Point, Md.	Sparrows Point, Md.		
3. When built.....		1905	1908		
4. Builder.....		Maryland Steel Co.	Maryland Steel Co.		
5. Contract cost.....		\$185,400	\$357,000		
6. Cost of outfit.....		\$73,724	\$22,435.35		
7. Total first cost.....		\$259,124	\$380,435.35		
8. Present value.....		\$200,000	\$325,000		
9. Time to build.....		24 months	1 year and 2 months.		
10. Material of hull.....		Steel	Steel		
11. Length over all.....		315 feet	304 feet		
12. Length between perpendiculars.....		300 feet	290 feet		
13. Beam.....		57 feet	51 feet		
14. Draft, anchorage.....		22 feet 6 inches	27 feet		
15. Drafts, light.....					
(a) Forward.....		11 feet 10 inches	9 feet 6 inches		
(b) Aft.....		12 feet 6 inches	13 feet 6 inches		
16. Drafts, loaded.....					
(a) Forward.....		18 feet 11 inches	18 feet 5 inches		
(b) Aft.....		17 feet 7 inches	21 feet 6 inches		
17. Displacement.....					
(a) Light.....		4,200 tons	3,375 tons		
(b) Loaded.....		6,440 tons	7,380 tons		
18. Number of hoppers.....		2	2		
19. Total capacity of hoppers.....		3,147 cubic yards	2,880 cubic yards		
20. Number of drags.....		2	5		
21. Type of drag.....		New York	Bucyrus, Ambrose Channel.		
22. Number, size, and type of—					
(e) Dredging pumps.....		Two 20-inch centrifugal	2 cast steel 20-inch centrifugal		
(b) Pumping engines.....		Two, 16 and 32 by 18-inch compound	Two, 17 and by 18-inch vertical compound		
23. Revolutions per minute of pumping engines.....		102	176		
24. Total indicated horsepower of pumping engines.....		630	1,124.48		
25. Number, size, and type of propelling engines.....		Two, 22 and 44 by 80-inch compound	Two, 22 and 46 by 80-inch vertical compound		
26. Revolutions per minute of propelling engines.....					
(a) Light.....		106	118		
(b) Loaded.....		96	118		
(c) While dredging.....		0 to 60	26 to 118		
27. Total indicated horsepower of propelling engines.....		1,436	1,983		

29. Number and type of boilers.	1 to 2 knots.	1 knot.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
---------------------------------	---------------	---------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

TABLE IV.—Operations of seagoing dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Delaware.			Galveston.		
	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
50. Time at work:						
(a) Pumping.....	2,612	35	29.75	723	7	10.64
(b) Turning in cut.....	316	28	3.60			
(c) To and from dump.....	1,843	33	21.04	297	35	4.37
(d) Dumping.....	50	23	5.67	49	15	7.72
(e) Taking fuel and supplies.....	480	3	5.47	199	15	2.93
(f) To and from wharf and anchorage.....	409	42	4.66	81	5	1.19
51. Time lost from work:						
(a) Bad weather.....	273	12	3.11	432	40	6.37
(b) Ordinary repairs.....	19	28	2.22			
(c) Extraordinary repairs.....	1,176	40	13.40	1,235	9	34.61
(d) Alterations and additions.....						
(e) Out of commission.....						
(f) Lying at berth nights and after working hours.....						
(g) Transferring from one district to another.....	15	56	18	174	50	2.58
(h) Miscellaneous.....	1,572		17.90	1,448	13	21.28
(i) Sundays and holidays.....				1,036		15.26
52. Total number of hours in year.....	8,784		100.00	8,784		100.00
53. Total time at work.....	5,726	44	65.19	1,350	17	19.89
54. Total time lost from work (exclusive of Sundays, holidays, and transfers). Item (51-(g+i)).....	1,495	16	17.02	3,090	3	44.40
55. Number of days upon which any dredging was done.....						
56. Average number of working hours per day.....						
57. Maximum number of working hours per day.....						
58. Average time to dredge one load.....						
59. Average time to dump one load.....						
60. Average time spent going to and from dump.....						

DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.				Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.
61. Pay roll.....	\$34,774.96	33.28		\$20,903.07	24.95	\$7,770.12	22.8		
62. Coal.....	28,215.32	27.01		19,622.21	22.44	11,590.77	34.0		
63. Fuel oil.....				793.34	.91				
64. Water.....									
65. Supplies:									
(a) Subsistence.....	10,823.59	10.36		6,847.16	7.85	2,201.55	6.5		
(b) Engine room.....	1,625.75	1.56		4,615.96	5.28	1,552.95	4.6		
(c) Miscellaneous.....	1,108.59	1.06		5,179.17	5.83	1,033.87	3.0		
66. Renewals or additions to outfit.....	686.87	.66		637.82	.73	28.50			
67. Ordinary repairs:									
(a) Hull.....	291.39	.28		2,898.59	3.29				
(b) Machinery.....	601.94	.63		192.89	.22				
68. Extraordinary expenses:									
(a) Hull.....	3,556.90	3.40		1,598.35	1.83				
(b) Machinery.....	7,496.41	7.18		5,314.52	6.08				
69. Alterations and additions:									
(a) Hull.....	1,102.18	.09							
(b) Machinery.....									
70. Laundry and miscellaneous expenses, wharfage, etc.....	324.38	.31		12,997.87	14.12	91.76	.3		
71. Office expense.....	5,575.50	5.34		3,886.86	4.45	667.60	2.0		
72. Surveys and superintendence.....	8,144.29	7.79		1,714.29	1.97	180.00	.5		
73. Rental.....						8,991.67	26.3		
Total cost.....	194,477.19	100.00		87,172.10	100.00	34,108.79	100.0		
74. Operating cost for year.....	\$77,559.46			\$71,596.50		\$33,261.19			
75. Cost per hour of time at work. Item 74 ÷ Item 53.....	\$13.54			\$53.023		\$28.45			
76. Value of time lost (exclusive of Sundays, holidays and transfer). Item 75 ÷ Item 54.....	\$20,110.56			\$16,967.36		\$11,806.75			
77. Cost per cubic yard based on cost per hour of time at work (cents). Item 75 ÷ Item 78.....	1.53			9.3		4.4			
78. Average number of cubic yards dredged per hour of time at work. Item 47 ÷ Item 53.....	883			569		675			
79. Cost per cubic yard with no repairs or additions (cents). [Total cost—(Items 67+68+69)] ÷ Item 47.....	1.80			10.4		4.3			
80. Cost per cubic yard with ordinary repairs (cents). [Total cost—(Items 68+69)] ÷ Item 47.....	1.82			10.6		4.3			
81. Gross cost per cubic yard (cents). Total cost ÷ Item 47.....	2.06			11.52		4.3			
82. Total cost per yard mile (cents).....	0.17			2.56		1.4			

TABLE IV.—Operations of seagoing dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Delaware.	Galveston.	
MISCELLANEOUS.			
83. Fuel consumed during year (long ton or barrel).	8,461 tons.....	20,620 barrels.....	11,500 barrels.
84. Average cost of fuel per long ton (or barrel).....	\$2,395 per ton.....	\$0.95.....	\$1 per barrel.
85. Fuel consumed per yard of dredged material in pounds. Item 83+Item 47.....	3.7.....	8.06 pounds.....	4.7 pounds.
86. Cost of water per 1,000 gallons.....	\$0.12.....	\$0.12.....	
87. Water purchased during year.....	9,611,000 gallons.....	9,611,000 gallons.....	
88. Total mileage of dredge during year.....	19,865.....	3,500 miles.....	1,785 miles.
	<p>Remarks.</p> <p>Of the amount of material removed, 1,274,447 cubic yards were dumped in a depositing basin, from which it was pumped ashore by a rehandling machine, and 3,780,411 cubic yards were pumped directly overboard on ebb tide.</p> <p>Renewal of worn-out pump liners, suction and discharge pipe, boiler repairs, rebuilding outboard bearings of main shafts, and miscellaneous repairs.</p> <p>One, 2 weeks. Eight years. One year. None.</p>	<p>Remarks.</p> <p>Dredge was engaged in dredging for the New Orleans district at the mouth of the Mississippi from Apr. 8 to June 30, inclusive. This time not used in calculations.</p> <p>(1) Out of commission while undergoing extraordinary repairs.</p> <p>(2) Contains Port Point charges of \$10,327.32 and expenses of tag San Luis of \$2,162.15.</p>	<p>Remarks.</p> <p>Dredge arrived at Passes of Mississippi River on Apr. 13, 1916, and started operations on Apr. 17, 1916. Work by this dredge was discontinued on June 30, 1916, to allow her to be docked for annual repairs, under supervision of the Galveston district.</p> <p>Dredged in the lower 7 miles of the Southwest Pass of the Mississippi River.</p>

Name.....	Gedney. ¹	Key West.	Abstraction.	Made, General G. G.
1. District to which dredge belongs.....	Newport, R. I.....	Jacksonville, Fla.....	Philadelphia, Pa.....	Grand Rapids, Mich.....
2. Where built.....	Wilmington, Del.....	Belfast, Me.....	Sparrows Point, Md.....	Sparrows Point, Md.....
3. When built.....	1887.....	1904.....	1904.....	1904.....
4. Builder.....	Jackson & Sharp.....	Geo. A. Glöckner.....	Maryland Steel Co.....	Maryland Steel Co.....
5. Contract cost.....	\$72,500, purchased 1892 ready for service.	\$91,000.....	\$394,000.....	\$105,000.....
6. Cost of outfit.....	Original outfit included in cost of ship.	\$10,708.....	\$37,577.24.....	\$12,993.....
7. Total first cost.....	\$72,500.....	\$101,708.....	\$341,577.24.....	\$177,983.....
8. Present value.....	\$15,000.....	\$48,000.....	\$100,000.....	\$145,000.....
9. Time to build.....	Unknown.....	1 year 5 months.....	15 months.....	1 year 3 months.....
10. Material of hull.....	Wood.....	Wood.....	Steel.....	Steel.....
11. Length over all.....	157 feet.....	142 feet.....	288 feet.....	177 feet.....
12. Length between perpendiculars.....	149 feet.....	131 feet.....	274 feet.....	166 feet.....
13. Beam.....	37 feet.....	31 feet 7 inches.....	47 feet 6 inches.....	38 feet.....
14. Depth amidship.....	16 feet.....	14 feet 8 inches.....	25 feet.....	19 feet.....
15. Drafts light: (a) Forward.....	7 feet.....	11 feet 8 inches.....	10 feet 6 inches.....	9 feet.....
(b) Aft.....	16 feet 6 inches.....	11 feet 6 inches.....	13 feet 6 inches.....	12 feet.....
16. Drafts loaded: ● (a) Forward.....	20 feet.....	17 feet.....	16 feet.....	19 feet.....
(b) Aft.....	17 feet.....	15 feet.....	17 feet 6 inches.....	17 feet.....
17. Displacement: (a) Light.....	1,500 tons.....	1,000 tons.....	4,000 tons.....	1,458 tons.....
(b) Loaded.....	2,277 tons.....	1,600 tons.....	5,070 tons.....	2,596 tons.....
18. Number of hoppers.....	6.....	2.....	2.....	2.....
19. Total capacity of hoppers.....	735 cubic yards.....	369 cubic yards.....	2,476 cubic yards.....	935 cubic yards.....
20. Number of drags.....	2.....	1.....	2.....	2.....
21. Type of drag.....	Flat renewable bottoms.....	Allen.....	New York.....	New York.....
22. Number, size, and type of— (a) Dredging pumps.....	Two 15-inch "Catacract" centrifugal.....	One 15-inch centrifugal.....	Two 20-inch centrifugal.....	Two 15-inch centrifugal.....
(b) Pumping engines.....	Two 15-inch diameter, 20-inch stroke, simple.....	One 12 and 22 by 14 inch compound.....	Two 16 and 32 by 18 inch, compound.....	Two 12 and 22 by 14 inch, compound.....
23. Revolutions per minute of pumping engines.....	137.....	210.....	160.....	230.....
24. Total indicated horsepower of pumping engines.....	200.....	190.....	670.....	400.....
25. Number, size, and type of propelling engines.....	Two 15 and 26 inch diameter, 20-inch stroke, compound condensing.....	One 17.5 and 32 by 14 inch, compound.....	Two 22 and 44 by 30 inch, compound.....	Two 15 and 30 by 24 inch, compound.....
26. Revolutions per minute of propelling engines: (a) Light.....	108 to 110.....	106.....	104.....	110.....
(b) Loaded.....	100.....	102.....	98.....	100.....
(c) While dredging.....	80 to 90.....	106 to 70.....	0 to 60.....	60.....
27. Total indicated horsepower of propelling engines.....	350 (estimated).....	380.....	1,200.....	731.....

TABLE IV.—Operations of seagoing dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Gateway.	Key Wet.	Manketan.	Made, General, G. O.
28. A verage speed: (a) Light..... (b) Loaded..... (c) While dredging..... 29. Number and type of boilers..... 30. Dimensions of boilers: (a) Diameter..... (b) Length..... (c) Heating surface (total)..... (d) Grate surface (total)..... 31. Boiler pressure (gauge)..... 32. Number of men in crew..... 33. Number of men required to operate dredge with single crew.....	8.7 knots..... 7.7 knots..... 0.8 knot..... 2 Scotch..... 147 inches..... 11 feet..... 1,740 square feet..... 130 square feet..... 70 pounds..... 23..... 23..... 23.....	7 knots..... 6 knots..... 2 knots..... 1 Scotch..... 16 feet 6 inches..... 12 feet..... 2,632 square feet..... 72.5 square feet..... 115 pounds..... 22..... 22..... 22.....	9 knots..... 7.3 knots..... 2.5 knots..... 4 Scotch return tubular..... 14 feet..... 12 feet..... 10,704 square feet..... 280 square feet..... 116 pounds..... 60..... 32..... 32.....	8.5 knots..... 7 knots..... 1.5 knots..... 2 Scotch..... 12 feet..... 13 feet..... 4,184 square feet..... 125 square feet..... 125 pounds..... 32..... 32.....
OPERATIONS.				
34. Location of dredging.....	Harbor at Fall River, Mass., Jan. 1 to Jan. 8, inclusive.	(1)	Delaware River, below Philadelphia, Pa.	Harbors on east shore of Lake Michigan.
35. Depth at mean low water before dredging.....	24 feet.....	23.3 feet.....	23 to 30 feet.....	13 to 17 feet.....
36. Depth at mean low water after dredging.....	25 to 29 feet.....	25.3 feet.....	30 to 33 feet.....	15 to 21 feet.....
37. Character of dredged material.....	Mud, 70 per cent; sand and gravel, 30 per cent.	Fine sand, shell, and clay.....	Mud, sand, and clay.....	Sand, clay, gravel, and stone.
38. Total number of miles run by dredge from work to dump, while loaded only, during year.....	68.....	4,511.5.....	4,411.....	515.....
39. Total number of loads dredged during year.....	8.....	1,556.....	370.....	515.....
40. A verage distance from work to dump per load.....	8.5 miles.....	3 miles.....	11.9 miles.....	1 mile.....
41. A verage number of loads dredged daily (counting days worked).....	2.....	6.21.....	1.7.....	3.55.....
42. Maximum amount in cubic yards dredged in 1 day.....	1,143.....	2,903.....	37,957.....	4,465.....
43. Maximum amount in cubic yards per load.....	592.....	369.....	2,116.....	935.....
44. A verage amount in cubic yards per load.....	557.....	344.7.....	1,965.....	946.8.....
45. A verage amount in cubic yards dredged per hour pumping—Item 47+Item 59a.....	222.....	334.17.....	1,678.....	357.4.....
46. Maximum amount in cubic yards dredged per hour pumping.....	249.....	369.....	2,000.....	907.....
47. Total amount in cubic yards dredged during year.....	4,459.....	536,981.....	3,843,888.....	333,102.....
48. Maximum amount in cubic yards dredged in 1 month.....	4,459.....	69,463.....	498,729.....	71,654.....
49. Total amount in cubic yards dredged by this dredge in this locality.....	879,841.....	1,484,165.....	27,254,910.....	4,379,804.....

DISTRIBUTION OF TIME AND VALUE OF LOST TIME.

[illegible]

DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.

	1966	1967	1968	1969	1970
1. Pay roll.....	\$3,660.01	75.40	\$16,452.88	36.6	\$24,310.37
2. Coal.....	351.73	7.12	10,771.80	23.9	21,562.92
3. Fuel oil.....					
4. Water.....	4.67	.85	113.50	3	
5. Supplies:					
(a) Substances.....	106.03	3.30	4,935.01	10.9	10,187.91
(b) Engine room.....	19.29	2.81	793.00	1.7	1,390.55
(c) Miscellaneous.....	75.44	1.44	1,680.60	3.7	1,191.31
Renewals or additions to outfit.....	12.90	.16	1,571.84	3.6	1,885.04
					.87
					9.96
					1.34
					750.49
					1.70
					817.29
					1.62
					10.69
					1.67
					1.70
					817.29
					1.62
					10.69
					1.67
					1.70
					817.29
					1.62
					10.69
					1.67
					1.70
					817.29
					1.62
					10.69
					1.67
					1.70
					817.29
					1.62
					10.69
					1.67
					1.70
					817.29
					1.62
					10.69
					1.67
					1.70
					817.29
					1.62
					10.69
					1.67
					1.70
					817.29
					1.62
					10.69
					1.67
					1.70
					817.29
					1.62
					10.69
					1.67
					1.70
					817.29
					1.62
					10.69
					1.67
					1.70
					817.29
					1.62
					10.69
					1.67
					1.70
					817.29
					1.62
					10.69
					1.67
					1.70
					817.29
					1.62
					10.69
					1.67
					1.70
					817.29
					1.62
					10.69
					1.67
					1.70
					817.29
					1.62
					10.69
					1.67
					1.70
					817.29
					1.62
					10.69
					1.67
					1.70
					817.29
					1.62
					10.69
					1.67
					1.70
					817.29
					1.62
					10.69
					1.67
					1.70
					817.29
					1.62
				</	

TABLE IV.—Operations of seagoing dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Gaining.		Key Weat.		Maintenance.		Wear, General, G. G.	
	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.
DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST—Continued.								
67. Ordinary repairs:								
(a) Hull.....					82.88	.08	135.83	.39
(b) Machinery.....			819.21	1.8	122.01	.12	2,349.62	5.23
68. Extraordinary repairs:								
(a) Hull.....			2,747.89	6.2	2,778.24	2.73	27.77	.05
(b) Machinery.....			430.77	.9	15,598.88	15.25	981.64	2.19
69. Alterations and additions:								
(a) Hull.....					86.56	.08	236.90	.53
(b) Machinery.....					138.51	.13	414.26	.92
70. Laundry and miscellaneous expenses, wharf, etc.					240.92	.24	577.12	1.28
71. Office expenses.....	412.22	8.24	845.08	1.9	5,575.50	5.45	1,548.06	3.44
72. Surveys and superintendence.....	83.24	1.51	3,806.25	8.5	8,144.26	7.96	2,073.43	4.60
73. Rental.....								
Total cost.....	678.59	100.00	44,967.83	100.0	102,275.39	100.00	44,913.77	100.00
74. Operating cost for year.....	\$595.26		\$37,163.71		\$99,748.52		\$37,146.08	
75. Cost per hour of time at work. Item 74 + Item 53.....	\$11.07		\$11.19		\$14.65		\$26.09	
76. Value of time lost (exclusive of Sundays, holidays, and transfer). Item 75 ÷ Item 54.....	\$996.07		\$49,492.36		\$35,903.59		\$105,149.70	
77. Cost per cubic yard based on cost per hour of time at work (cents). Item 75 ÷ Item 76.....	13.34		6.95		1.80		0.11	
78. Average number of cubic yards dredged per hour of time at work—Item 47 ÷ Item 53.....	83		161.9		897		286.6	
79. Cost per cubic yard with no repairs or additions (cents). [Total cost—(Items 67+68+69) ÷ Item 47.....	15.22		7.62		2.17		12.2	
80. Cost per cubic yard with ordinary repairs (cents). [Total cost—(Items 68+69) ÷ Item 47.....	15.22		7.80		2.40		12.9	
81. Gross cost per cubic yard (cents). Total cost + Item 47.....	15.22		8.37		2.66		12.4	
82. Total cost per yard mile (cents).....	1.79		2.79		0.22		1.34	
MISCELLANEOUS.								
83. Fuel consumed during year (long ton or barrel).....	55 tons		2,237.37 long tons		6,278 tons		2,232.5 includes 199.3 used in winter quarters.	
84. Average cost of fuel per long ton (or barrel).....	\$3.47 per ton		\$4.81		\$3.96		\$4.86.	
85. Fuel consumed per yard of dredged material in pounds—Item 83 ÷ Item 47.....	\$7.6		9.333		3.7		13.9, exclusive of 199.3 tons used in winter quarters.	

[illegible]

TABLE IV.—Operations of seagoing dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Cd. P. S. Michle.	Mingus.
1. District to which dredge belongs.....	First, Portland, Oreg..... Seattle, Wash.....	Wilmington, Del. Baltimore, Md. 1913
2. Where built.....	Seattle, Wash.....	Speeden Shipbuilding Co.
3. When built.....	1913.....	\$158,705.35.
4. Builder.....	Seattle Construction & Dry Dock Co.....	\$5,254.19.
5. Contract cost.....	\$325,585.....	\$183,869.52.
6. Cost of outfit.....	\$375,000.....	\$193,659.52.
7. Total first cost.....	\$375,188.....	1 year 9 months and 8 days.
8. Present value.....	\$350,000.....	Steel.
9. Time to build.....	18 months.....	132 feet.
10. Material of hull.....	Steel.....	147 feet.
11. Length over all.....	242 feet.....	30 feet.
12. Length between perpendiculars.....	230 feet.....	12 feet.
13. Beam.....	43 feet.....	5 feet 3 inches.
14. Depth amidship.....	20 feet.....	12 feet 6 inches.
15. Drafts, light: (a) Forward..... (b) Aft.....	9 feet..... 11 feet.....	11 feet 8 inches. 12 feet 8 inches.
16. Drafts, loaded: (a) Forward..... (b) Aft.....	17 feet..... 17 feet.....	705 tons. 1,105 tons.
17. Displacement: (a) Light..... (b) Loaded.....	1,535,029 tons..... 3,353,922 tons.....	2. 416 cubic yards.
18. Number of hoppers.....	6.....	1. Frdhling.
19. Total capacity of hoppers.....	1,280 cubic yards.....	One 16-inch (4 foot 6 inch diameter im- peller) Frdhling.
20. Number of drags.....	1.....	One 12 by 24 by 16 inch stroke, compound.
21. Type of drag.....	New York (grating).....	230 dredging; 240 discharging.
22. Number, size, and type of— (a) Dredging pumps..... (b) Pumping engines.....	One 26-inch centrifugal..... 1 triple expansion, 12 by 22 by 35 by 24 inch stroke.	221. Two 12 by 24 by 16 inch stroke, compound.
23. Revolutions per minute of pumping engines.....	130.....	135.
24. Total indicated horsepower of pumping en- gines.....	675.....	120.
25. Number, size, and type of propelling engines.....	2 compound, fore and aft, 16 by 32 by 24 inch stroke.	90.
26. Revolutions per minute of propelling engines: (a) Light..... (b) Loaded..... (c) While dredging.....	138..... 122..... 110.....	Starboard 211, port 218; total 429.
27. Total indicated horsepower of propelling en- gines.....	1,000.....	

22. Average speed:	8 knots.	8 knots.	7 knots.
(a) Light	14 knots.	14 knots.	6 knots.
(b) Loaded	2, Ballin water tube.	2, Ballin water tube.	1 knot.
23. Number and type of boilers.	Steam drum, 36 inches.	Steam drum, 36 inches.	1 Scotch marine.
30. Dimensions of boilers:	(a) Diameter.	(a) Diameter.	14 feet 6 inches.
(b) Length.	(b) Length.	(b) Length.	11 feet.
(c) Heating surface (total).	(c) Heating surface (total).	(c) Heating surface (total).	2,110.6 square feet.
(d) Grate surface (total).	(d) Grate surface (total).	(d) Grate surface (total).	67.5 square feet.
31. Boiler pressure (gauge).	225 pounds.	225 pounds.	135 pounds average (150 highest point).
32. Number of men in crew.	34.	34.	25 winter; 31 summer.
33. Number of men required to operate dredge with single crew.	26.	26.	25.
OPERATIONS.			
34. Location of dredging.	Coot Bay Bar, Oreg.	Grays Harbor Bar, Wash.	Wilmington Harbor.
35. Depth at mean low water before dredging.	23 feet.	17 feet.	15 feet.
36. Depth at mean low water after dredging.	30 feet.	19 feet.	18 to 20 feet.
37. Character of dredging material.	Medium sand.	Fine sand and mud.	Mud and gravel.
38. Total number of miles run by dredges from work to dump, while loaded only, during year.	1,033.	323.	656.
39. Total number of loads dredged during year.	1,003.	106.	1,313.
40. Average distance from work to dump per load.	1 mile.	3.01 miles.	$\frac{1}{2}$ mile.
41. Average number of loads dredged daily (counting days worked).	7.59.	2.91.	5.2.
42. Maximum amount in cubic yards dredged in one day.	17,000.	5,009.	4,000.
43. Maximum amount in cubic yards per load.	1,290.	1,278.	250.
44. Average amount in cubic yards per load.	1,190.	957.	328.1.
45. Average amount in cubic yards dredged per hour pumping—Item 47 + Item 50.	1,678.	778.	423.5.
46. Maximum amount in cubic yards dredged per hour pumping.	2,312.	1,050.	1,802.
47. Total amount in cubic yards dredged during year.	1,193,887.	100,523.	430,209.
48. Maximum amount in cubic yards dredged in one month.	263,131.	71,699.	69,864.
49. Total amount in cubic yards dredged by this dredge in this locality.	2,335,712.	144,408.	462,950.

TABLE IV.—Operations of seagoing dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Col. P. S. Miché.				Mingus.				
	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
DISTRIBUTION OF TIME AND VALUE OF LOST TIME.									
50. Time at work:									
(a) Pumping.....	713	22	10.076	129	6	7.576	1,015	48	11.56
(b) Turning in cut.....	7	12	.438	26	46	1.689	124	18	1.42
(c) To and from dump.....	314	14	4.436	62	20	3.071	760	33	8.67
(d) Dredging.....	131	2	1.861	10	68	.898	524	1	6.08
(e) Taking fuel and supplies.....	79	44	1.126	17	11	1.008	362	31	4.12
(f) To and from wharf and anchorage.....	13	7	.186	22	8	1.299	224	5	2.55
51. Time lost from work:									
(a) Bad weather.....	993	32	14.033	263	53	15.486	66	45	.76
(b) Ordinary repairs.....	56	11	.794	0	18	.370	21	23	.24
(c) Extraordinary repairs.....	109	26	1.545				282	17	3.21
(d) Alterations and additions.....									
(e) Out of commission.....	2,235	45	31.575						
(f) Lying at berth nights and after working hours.....	1,518	57	21.454	780	39	45.812	3,669	24	41.77
(g) Transferring from one district to another.....	44	15	.625	96		5.634			
(h) Miscellaneous.....	10	57	.158	2	41	.157	198		2.26
(i) Sundays and holidays.....	832	17	12.038	268		16.902	1,524	55	17.36
52. Total number of hours in year.....	3,784		100.000	1,704		100.000	8,784		100.00
53. Total time at work.....	1,263	41		226	20		3,021	16	
54. Total time lost from work (exclusive of Sundays, holidays, and transfers, item [51]—(g+i)).	4,524	47		1,068	31		4,237	49	

55. Number of days upon which any dredging was done.	127.	36.	252 days on regular work.			
			7 hours 24 minutes.	9 hours 30 minutes.	12 hours.	
56. Average number of working hours per day.	16.	16.	9 hours 54 minutes.	9 hours 30 minutes.	12 hours.	
57. Maximum number of working hours per day.	42.6 minutes.	42.6 minutes.	1 hour 13 minutes.	1 hour 13 minutes.	1 hour 13 minutes.	
58. Average time to dredge one load.	7.8 minutes.	7.8 minutes.	9 minutes.	9 minutes.	9 minutes.	
59. Average time to dump one load.	18.7 minutes.	18.7 minutes.	20 minutes.	20 minutes.	20 minutes.	
60. Average time spent going to and from dump.						
DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.						
	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.
61. Pay roll	\$23,025.03	32.538	\$5,574.43	32.517	\$18,715.51	39.02
62. Coal	17,716.59	25.038	4,614.77	26.919	7,990.19	16.65
63. Fuel oil	41.39	.068	108.08	.630	84.39	.18
64. Water						
65. Supplies:						
(a) Substances	4,827.90	6.823	1,377.49	8.085	5,503.42	11.53
(b) Engine room	1,126.38	1.590	241.40	1.408	1,883.80	2.94
(c) Miscellaneous	1,889.46	1.964	190.49	1.111	1,510.94	3.16
66. Renewals or additions to outfit	1,382.35	1.953	424.13	2.474	1,502.52	1.05
67. Ordinary repairs:						
(a) Hull	452.08	.790	3.79	.021	18.36	.04
(b) Machinery	1,227.64	1.738	57.38	.334	443.13	.93
68. Extraordinary repairs:						
(a) Hull	651.85	.921				
(b) Machinery	2,013.49	2.844	169.36	.987	1,835.60	3.84
69. Alterations and additions:					1,135.63	2.38
(a) Hull	3,245.61	4.728				
(b) Machinery	10,000.00	14.133				
70. Laundry and miscellaneous expenses, wharf, etc.	668.49	.945	167.42	.976	1,917.95	3.30
71. Office expense	732.02	1.085	165.10	.963	1,115.74	2.33
72. Surveys and superintendence	2,061.01	2.913	490.81	2.912	1,927.02	4.03
73. Rental			8,550.00	20.708	1,191.28	2.49
					1,944.64	1.98
Total cost	70,761.46	100.000	17,143.08	98.986	47,823.79	100.00

TABLE IV.—Operations of seagoing dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Col. P. S. Mille.		Minqas.
74. Operating cost for year.....	\$50,177.78.....	\$16,248.16.....	\$39,430.37.....
75. Cost per hour of time at work.....	\$39.86.....	\$71.70.....	\$13.05.....
76. Value of time lost (exclusive of Sundays, holidays, and transfer). Item 75×Item 54.....	\$196,321.56.....	\$78,476.94.....	\$45,303.42.....
77. Cost per cubic yard based on cost per hour of time at work (cents). Item 75÷Item 78.....	4.20.....	16.18.....	9.18.....
78. Average number of cubic yards dredged per hour of time at work—Item 47÷Item 53.....	949.....	443.....	142.3.....
79. Cost per cubic yard with no repairs or additions (cents). [Total cost—(Items 67+68+69)]÷Item 47.....	4.43.....	16.32.....	9.37.....
80. Cost per cubic yard with ordinary repairs (cents). [Total cost—(Items 68+69)]÷Item 47.....	4.58.....	16.38.....	9.96.....
81. Gross cost per cubic yard (cents). Total cost÷Item 47.....	5.92.....	17.05.....	11.1.....
82. Total cost per yard mile (cents).....	5.92.....	5.06.....	22.2.....
MISCELLANEOUS.			
83. Fuel consumed during year (long ton or barrel).....	14,373.68 barrels.....	3,554.69 barrels.....	1,912 tons.....
84. Average cost of fuel per long ton (or barrel).....	\$1.30 per barrel.....	\$1.215 per barrel.....	\$4.16.....
85. Fuel consumed per yard of dredged material, in pounds—Item 83÷Item 47.....	3.36.....	11.35.....	9.9.....
86. Cost of water per 1,000 gallons.....	20 cents.....	20 cents.....	8.1 cents.....
87. Water purchased during year.....	164,132 gallons.....	515,787 gallons.....	1,065,000 gallons.....
88. Total mileage of dredge during year.....	4,200.....	2,500.....	1,363.....
	<i>Remarks.</i>	<i>Remarks.</i>	<i>Remarks.</i>
	Extraordinary repairs consisted in new stern bearing, protection device and strengthening of trunnion of ladder. Docked 3 days in March, 1916. Docked 1 day in July, 1916. Present sand pump 3 years old and has never been relined. Pump liners in good condition now and show little wear. Transferred from Seattle district to first Portland district Feb. 4, 1916; transferred to Seattle district on Nov. 8, 1916; and	Extraordinary repairs to machinery consisted of retubing portion of boiler. Not on dry dock while in Seattle (Wash.) district. Present sand pump 3 years old; has never been relined. Pump liners in good condition now and show little wear. Transferred back to first Portland (Oreg.) district from Seattle (Wash.) district Nov. 8, 1916. Transferred from Portland (Oreg.) first district to Seattle (Wash.) district Nov.	The channel has been increased to a general depth of from 18 to 20 feet over a width of 200 feet for a length of about 1 mile. This dredge operated as a pipe line hydraulic dredge in discharging material ashore, using an average length of 1,200 linear feet of 16-inch discharge pipe. The cost of pipe line and retaining banks is given in the distribution of cost. It is impracticable to render an accurate separate report of this dredge as a pipe line dredge in Table V.

The extraordinary repairs to hull were mainly made during the annual overhauling and repainting of the dredge and include dry-docking, painting, etc., and those to machinery consisted of repairs to dredge arms, propeller blades, grate bars, etc. The dredge was in dry dock from Mar. 13 to 31, 1916, having dredge arm, suction pipe, and turnbuckles repaired, and from Apr. 20 to May 17, 1916, undergoing general overhauling and repair, painting, etc. Present sand pump has been in use about 15 months and is expected to run a year longer without new liners. About 100,000 cubic yards of this amount were removed by dumping directly overboard in ebb tide.

8, 1916.
Transferred back to first Portland (Oreg.) district from Seattle (Wash.) district Dec. 14, 1916.
The rental charge for the dredge while in the Seattle district was \$60 per day. The total rent charge for the entire period was \$4,980.
No accidents in Seattle (Wash.) district.

from the Seattle district to Portland, Oreg., on Dec. 14, 1916.
Grounded on North Spit at Coos Bay Bar and was pulled into deep water by tugs; little damage was done.

TABLE IV.—Operations of seagoing dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Navetank.	New Orleans.	Barkton.	Subst.
1. District to which dredge belongs.....	Newport, R. I.....	New Orleans, La.....	Second New York.....	Dallas, Tex.
2. Where built.....	Sparrows Point, Md.....	Quincy, Mass.....	Sparrows Point, Md.....	New York, N. Y.
3. When built.....	1908.....	1912.....	1908.....	1901.
4. Builder.....	Maryland Steel Co.....	Fore River Ship Building Co.....	Maryland Steel Co.....	Townsend & Downey.
5. Contract cost.....	\$371,425.....	\$215,300.....	\$371,425.....	\$84,833.40.
6. Cost of outfit.....	\$12,704.26.....	\$1,901.66.....	\$12,704.....	
7. Total first cost.....	\$384,129.26.....	\$220,101.66.....	\$387,000.....	
8. Present value.....	\$280,000.....	\$475,000.....	\$275,000.....	
9. Time to build.....	10 months.....	18 months.....	9 months.....	10 months.
10. Material of hull.....	Steel.....	Steel.....	Steel.....	Wood.
11. Length over all.....	200 feet.....	315 feet.....	200 feet.....	145 feet.
12. Length between perpendiculars.....	276 feet.....	200 feet.....	276 feet.....	137 feet.
13. Beam.....	47 feet 6 inches.....	50 feet.....	47 feet 6 inches.....	35 feet.
14. Depth amidship.....	28 feet.....	26 feet.....	26 feet.....	21 feet.
15. Drafts: light.....	13 feet.....	14 feet 3 inches.....	13 feet 6 inches.....	7 feet 4 inches.
(a) Forward.....	(b) Aft.....	16 feet 6 inches.....	14 feet 6 inches.....	9 feet 11 inches.
16. Drafts loaded:.....	(a) Forward.....	22 feet 6 inches.....	23 feet 6 inches.....	8 feet 6 inches.
(b) Aft.....	24 feet 4 inches.....	24 feet 7 inches.....	23 feet inches.....	12 feet 5 inches.
17. Displacement:.....	3,150 tons.....	4,425 tons.....	2,980 tons.....	760 tons.
(a) Light.....	6,517 tons (average load).....	7,940 tons.....	6,900 tons.....	1,100 tons.
18. Number of hoppers.....	2.....	1.....	2.....	2.
19. Total capacity of hoppers.....	2,884 cubic yards.....	3,102 cubic yards.....	2,884 cubic yards.....	325 cubic yards.
20. Number of drags.....	2.....	1.....	2.....	2.
21. Type of drag.....	Removable flat bottom.....	Fruhling type.....	Ambrose Channel, special design.....	Detachable mouthpiece and scraper.
22. Number, size, and type of— (a) Dredging pumps.....	Two 20-inch centrifugal, closed runner.....	Two 24-inch centrifugal.....	Two 20-inch centrifugal.....	Two 10-inch centrifugal.
(b) Pumping engines.....	Two 17 and 36 by 18 inch, compound.....	Two 12, 19, and 32 by 24 inch vertical marine triple expansion.....	Two 17 and 36 by 18 inch, compound.....	Two horizontal, simple stroke 10½ by 11 inches; port 10½ by 11 inches.
23. Revolutions per minute of pumping engines.....	150 to 155.....	150.....	150 to 165.....	275.
24. Total indicated horsepower of pumping engines.....	781; test Aug. 30, 114 pounds steam.....	1,230.....	Builder's trials, 928 (3).....	57.
25. Number, size, and type of propelling engines.....	Two 23 by 46 by 30 inch, compound.....	Two 12, 19, and 32 by 24 inch vertical marine triple expansion.....	Two 22 and 46 by 30 inch, compound.....	Two vertical compound, stroke 13½ by 27½ by 18 inches; port 13½ by 27½ by 18 inches.
26. Revolutions per minute of propelling engines:.....	(a) Light.....	108.....	106 to 112.....	137.
(b) Loaded.....	108.....	90.....	100 to 106.....	126.
(c) While dredging.....	0 to 90.....	40.....	0 to 100.....	75.

27. Total indicated horsepower of propelling engines	1,599 (test Aug. 30, 114 pounds steam).	320 at 100 revolutions.	Builder's trials, 1894 (3)	382.
28. Average speed:				
(a) Light.....	10 knots.....	8 knots.....	9.5 miles.....	8.5 knots.
(b) Loaded.....	7 knots.....	6 knots.....	7 knots.....	7.5 knots.
(c) While dredging.....	4 to 24 knots.....	0.5 knot.....	0 to 3 miles.....	3.
29. Number and type of boilers.....	4 Scotch marine.....	4 Babcock & Wilcox semi-marine water tube.	4 Scotch marine.....	2 Scotch marine.
30. Dimensions of boilers:				
(a) Diameter.....	14 feet 6 inches.	13 feet 6 inches (length).	14 feet 6 inches.....	9 feet 6 inches.
(b) Length.....	12 feet.....	12 feet 4 inches (width).	12 feet.....	10 feet.
(c) Heating surface (total).....	10,400 square feet.	12,864 square feet.	10,400 square feet for 4 boilers.....	871.7 square feet.
(d) Grate surface (total).....	373 square feet.	317 square feet.	373 square feet for 4 boilers.....	373 square feet.
31. Boiler pressure (gauge).....	114.....	200 pounds.....	118 average.....	110.
32. Number of men in crew.....	48.....	50.....	48.....	16.
33. Number of men required to operate dredge with single crew.....	48 (8 hours).....	50.....	48.....	16.
OPERATIONS.				
34. Location of dredging.....	Pollock Rip Channel, Mass., Aug. 30 to Dec. 21, inclusive.	Southwest Pass, Mississippi River.	Rock Hook Channel, New York Harbor.	Sabine Pass Jetty Channel and Port Arthur Canal.
35. Depth at mean low water before dredging.....			30 to 35.....	26 feet.
36. Depth at mean low water after dredging.....			30 to 40 and over.....	27½ feet.
37. Character of dredged material.....	Sand, 60 per cent; gravel and small stone, 10 per cent.	Sand, mud, and silt.	60 per cent sand and 40 per cent mud.	Sand, silt, and soft mud.
38. Total number of miles run by dredges from work to dump, while loaded only, during year.....	1,869.....	3,636.....	1,464.....	1,377.
39. Total number of loads dredged during year.....	267.....	1,131.....	76 loads.....	1,377.
40. Average distance from work to dump per load.....	7.....	2.9 miles.....	19.6 miles.....	2 mile.
41. Average number of loads dredged daily (counting days worked).....	3.708.....	6.....	1½.....	9.3.
42. Maximum amount in cubic yards dredged in one day.....	15,551.....	26,364.....	7,311.....	4,781.
43. Maximum amount in cubic yards per load.....	2,493.....	2,712.....	2,471.....	243.75.
44. Average amount in cubic yards per load.....	2,076.....	1,994.....	2,378.....	243.75.
45. Average amount in cubic yards dredged per hour pumping - item 47 + item 39a.....	1,286.....	1,544.....	316.....	466.
46. Maximum amount in cubic yards dredged per hour pumping.....	2,280.....	7,912.....	397.....	547.
47. Total amount in cubic yards dredged during year.....	555,092.....	1,895,476.....	180,409.....	336,644.
48. Maximum amount in cubic yards dredged in one month.....	174,737.....	329,735.....	86,592.....	54,112.
49. Total amount in cubic yards dredged by this dredge in this locality.....	2,861,669.....	8,379,888 at Southwest Pass; 27,379 at South Pass.	931,116.....	6,215,868.

TABLE IV.—Operations of seagoing dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Nacireht.			New Orleans.			Renton.			Sabine.		
	Hours.	Minutes.	Percent- age.	Hours.	Minutes.	Percent- age.	Hours.	Minutes.	Percent- age.	Hours.	Minutes.	Percent- age.
DISTRIBUTION OF TIME AND VALUE OF LOST TIME.												
50. Time at work:												
(a) Pumping.....	447	45	5.03	1,228	25	13.96	567	25	6.460	673	15	7.7
(b) Turning in cut.....	27	05	31	2	10	.02	56	56	6	112	20	1.3
(c) To and from dump.....	441	20	5.02	884	10	10	292	10	3.326	343	35	3.9
(d) Dumping.....	46	20	.52	142	44	1.6	28	50	.328			
(e) Taking fuel and supplies.....	176		1.90	243	3	2.8	105	50	1.205	68	26	8
(f) To and from wharf and anchorage.....	258	20	2.84	255	10	2.9	14	35	.166	260	35	3.0
51. Time lost from work:												
(a) Bad weather.....	746		8.40	297	10	3.4	46	40	.531	108		1.2
(b) Ordinary repairs.....	350	30	3.86	2	40	.02	24		.273	302	15	9.1
(c) Extraordinary repairs.....	48		.54	499	40	5.68						
(d) Alterations and additions.....							168		1.913			
(e) Out of commission.....	4,688		53.10				5,987	15	63.161	536		9.5
(f) Lying at berths nights and after work- ing hours.....	100	45	1.04	3,863	31	44	53	10	.605	4,778	20	54.4
(g) Transferring from one district to another.....												
(h) Miscellaneous.....	21	55	.24	509	2	5.8				141	15	1.6
(i) Sundays and holidays.....	1,432		16.20	856	15	9.8	1,440		16.394	660		7.5
52. Total number of hours in year.....	8,784		100.00	8,784		100.00	8,784		100.000	8,784		100.00
53. Total time at work.....	1,396	50		2,755	42	31.3	1,064	55		1,458	10	
54. Total time lost from work (exclusive of Sun- days, holidays, and transfers, item [51]-(g+1)).	5,965	10		5,172	3	59.9	6,279	5		6,665	50	
55. Number of days upon which any dredging was done.....	72			193			49			145		
56. Average number of working hours per day.....				14 hours 30 minutes			21 hours 44 minutes			11 hours		
57. Maximum number of working hours per day.....				24 hours			24 hours			11 hours		
58. Average time to dredge one load.....				1 hour 25 minutes			7 hours 24 minutes			30 minutes		
59. Average time to dump one load.....				7 minutes			22 minutes			15 minutes		
60. Average time spent going to and from dump.....				45 minutes			3 hours 51 minutes					

DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.					
	Amount.	Percentage.	Amount.	Percentage.	Amount.
61. Pay roll.....	\$24,983.05	35.35	\$33,843.55	36.9	\$22,426.14
62. Coal.....	24,260.34	34.30	18,386.30	20	9,860.24
63. Fuel oil.....					
64. Water.....	683.01	.87			320.01
65. Supplies:					
(a) Substenance.....	6,301.90	9.02	10,452.51	11.4	5,672.27
(b) Engine room.....	1,945.88	1.92	2,705.26	3	1,628.29
(c) Miscellaneous.....	1,821.83	2.59	2,591.04	2.8	1,740.04
66. Renewals or additions to outfit.....	2,831.62	4.02	2,316.26	2.5	1,056.76
67. Ordinary repairs:					
(a) Hull.....	14.00	.20			1,387.57
(b) Machinery.....	820.60	1.17	272.13	.3	
68. Extraordinary repairs:					
(a) Hull.....	1,180.00	1.57	12,377.19	13.5	
(b) Machinery.....	3,004.80	4.25	4,264.26	4.7	10,832.06
69. Alterations and additions:					
(a) Hull.....					
(b) Machinery.....	716.68	1.01	370.15	.4	1,413.31
70. Laundry and miscellaneous expenses, wharfage, etc.....			365.10	.3	
71. Office expense.....	1,339.70	1.89	3,141.57	3.4	13,109.44
72. Surveys and superintendence.....	1,312.60	1.83	760.00	.8	804.03
73. Rental.....					7,368.80
Total cost.....	70,650.91	100.00	91,797.37	100.00	76,671.95
74. Operating cost for Year.....	\$45,471.67		\$70,612.02		\$50,488.86
75. Cost per hour of time at work.....	\$46.74		\$25.53		\$17.40
76. Value of time lost (exclusive of Sundays, holidays, and transfer), Item 75 x Item 54.....	\$78,273.48		\$122,290.76		\$297,624.00
77. Cost per cubic yard based on cost per hour of time at work (cents), Item 75 ÷ Item 54.....	8.189		3.74		28
78. Average number of cubic yards dredged per hour of time at work, Item 75 ÷ Item 53.....	397.39		683		169.4
79. Cost per cubic yard with no repairs or additions (cents), [Total cost - (Items 67 + 68 + 69)] ÷ Item 47.....	8.670		3.56		35.6
80. Cost per cubic yard with ordinary repairs (cents), [Total cost - (Items 68 + 69)] ÷ Item 47.....	8.812		3.97		36.4
81. Gross cost per cubic yard (cents), Total cost ÷ Item 47.....	8.812		4.57		42.4
82. Total cost per yard mile (cents).....	1,250		1.53		21.6

TABLE IV.—Operations of snagging dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Miscellaneous.	New Orleans.	Baton Rouge.	Subtotal.
MISCELLANEOUS.				
83. Fuel consumed during year (long ton or barrel).....	3,548 tons.....	4,747.7 long tons.....	2,948 tons.....	7,474.15 barrels.
84. Average cost of fuel per long ton (or barrel).....	\$6.....	\$3.874 per long ton.....	\$3.46.....	\$0.932.
85. Fuel consumed per yard of dredged material in pounds. Item 83+Item 47.....	14,585 pounds.....	6.64 pounds.....	38.34 pounds.....	7.15 pounds.
86. Cost of water per 1,000 gallons.....	20 cents.....		20 cents.....	0.35.
87. Water purchased during year.....	1,129,165 gallons.....		1,600,000 gallons.....	16,000 gallons.
88. Total mileage of dredge during year.....	6,173 miles.....	6,866 miles.....	4,100 miles.....	6,966 miles.
	Remarks. Machinery: Jan. 20, 1 a. m. to Feb. 8, 3.30 p. m., in dry dock Boston Navy Yard; new port propeller placed, main shaft lined up from engines, new bushings placed on tall shafts and bearings remetalled. Hull: Bottom gates repaired; hull painted. One docking, Jan. 20, 1 a. m. to Feb. 8, 3.30 p. m. Port pump placed in service Dec. 15, 1914. Starboard pump placed in service May 10, 1916. Probably about 30 days. None. Nov. 10: Lost starboard anchor in south-southwest gale and heavy sea off Stone Horse Shoal. Nov. 21: Struck on starboard bow by 4-mast schooner while loaded on way to dump; house pipe, roller chock casting, and about 15 feet of bulwarks damaged.	Remarks. At the beginning of the fiscal year the available depth in channel in southwest pass was 28 feet with a minimum width of 100 feet. At the end of the period covered by this report, the available depth was 28 feet. The total yardage necessary to be removed to secure the project channel of 35 feet by 1,000 feet was 7,250,000 cubic yards at the beginning of the period of this report and 4,350,000 cubic yards at the end of the period. The extraordinary repairs to the dredge consisted of scraping and painting the hull and general overhauling, and repairs to machinery, boilers, etc. The dredge was docked once during the period of this report. The sand pump is the same as was originally installed, and is 44 years old. The pump should run one year without new liners.	Remarks. From Feb. 1 to May 1, 1916, the Kartlan was installing and testing a new pump. Part of these tests were made by actual dredging from various parts of the harbor; 54,068 cubic yards of material were thus excavated, not in connection with any harbor improvement and not included above.	Remarks. Average increase in depth, both at outer end of jetty channel and at the mouth of the Port Arthur Canal, about 1.5 feet. It is believed, however, that a large percentage of the increased depth at the outer end of the jetty channel may be attributed to the east jetty extension and to frequent use of this channel by deep-draft vessels. Hull scraped and copper painted twice during year. Repairs to pumping and main engines, renewal of starboard shaft, and all bearings renewed while in dry dock first time. Propeller tightened on shaft the second time she was in dry dock. In dry dock twice. Total number of days, 25. Port pump renewed during June, 1916. Starboard pump 16 years.

Name.....	Son Pablo	Savannah	Sumter	Winged Bay
1. District to which dredge belongs.....	First, San Francisco, Cal.....	Savannah, Ga.....	Charleston, S. C.....	Charleston, S. C.
2. Where built.....	Baltimore, Md.....	Sparrows Point, Md.....	Petersburg, Va.....	Wilmington, Del.
3. When built.....	Contract Sept. 14, 1914; completed June, 1916.	1894.....	1904.....	1894.....
4. Builder.....	Skinner Ship Building & Dry Dock Co.	Maryland Steel Co.....	Petersburg Iron Works.....	The Bucyrus Co.
5. Contract cost.....	\$201,990.....	\$176,500.....	\$144,300.....	\$75,800.....
6. Cost of outfit.....	\$3,670.84 (paid by San Francisco office).	\$19,685.08.....	\$7,684.14.....	\$12,200.....
7. Total first cost.....	\$205,660.84.....	\$196,085.08.....	\$191,980.....	\$88,000.....
8. Present value.....	Dredge has not depreciated any in value.	\$71,000.....	\$75,000.....	\$35,000.....
9. Time to build.....	December, 1914, to June, 1916, 19 months.	1 year 7 months.....	8 years.....	11 months.....
10. Material of hull.....	Steel.....	Steel.....	Oak, yellow pine, and black-mastick.....	Oak frame, oak and pine planking.....
11. Length over all.....	163 feet 6 inches.....	177 feet.....	200 feet.....	141 feet.....
12. Length between perpendiculars.....	165 feet.....	166 feet.....	185 feet.....	136 feet.....
13. Beam.....	33 feet.....	38 feet.....	41 feet.....	31 feet 6 inches.....
14. Depth amidships.....	17 feet.....	19 feet.....	22 feet.....	13 feet 6 inches.....
15. Drafts: Light.....	8 feet 6 inches.....	10 feet.....	13 feet.....	7 feet.....
(a) Forward.....	15 feet.....	13 feet.....	13.9 feet.....	9 feet.....
(b) Aft.....	14 feet.....	18 feet.....	21 feet.....	13 feet.....
16. Drafts, loaded: (a) Forward.....	15 feet 6 inches.....	17 feet.....	21 feet.....	13 feet.....
(b) Aft.....	14 feet.....	18 feet.....	21 feet.....	13 feet.....
17. Displacement: (a) Light.....	1,100 tons.....	1,461 tons.....	1,706.23 tons.....	831 tons.....
(b) Loaded.....	1,620 tons.....	2,060 tons.....	2,664 tons.....	1,290 tons.....
18. Number of hoppers.....	Two.....	Two.....	Two.....	Two.....
19. Total capacity of hoppers.....	820 cubic yards.....	\$65 cubic yards.....	964 cubic yards.....	205 cubic yards.....
20. Number of drags.....	Two.....	Two.....	Two.....	One.....
21. Type of drag.....	Grated suction head.....	Special design by Savannah engineer's office.....	Ordinary drag, with opening in rear.....	Ordinary drag, with opening in rear.....
22. Number, size, and type of— (a) Dredging pumps.....	Two 15-inch centrifugal.....	Two 15-inch centrifugal.....	Two 19-inch centrifugal, Edwards make.....	One 15-inch Bucyrus Co. make.....
(b) Pumping engines.....	Two.....	Two 12 and 23 by 14 inch stroke, compound.....	Two 14 and 26 by 18 inch stroke, fore and aft, compound.....	One 12 and 22 by 14 inch fore and aft, compound.....
23. Revolutions per minute of pumping engines.....	160.....	216.....	226.....	226.....
24. Total indicated horsepower of pumping engines.....	200.....	361.3.....	730.....	250.....
25. Number, size, and type of propelling engines.....	One 18 by 26 by 24 inch vertical, 2-cylinder, compound.....	Two 15 and 30 by 24 inch stroke, compound.....	One fore-and-aft compound, 22 and 44 by 30 inch stroke.....	One fore-and-aft compound, 17 and 22 by 24 inch stroke.....
26. Revolutions per minute of propelling engines: (a) Light.....	106.....	120.....	90.....	115.....
(b) Loaded.....	100.....	110.....	85.....	106.....
(c) While dredging.....	72.....	80 to 90.....	20 (average).....	75.....
27. Total indicated horsepower of propelling engines.....	780.....	654.9 on trial Jan. 6, 1916, with 120 pounds steam.....	700.....	400.....

TABLE IV.—Operations of seagoing dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	San Pablo.	Savannah.	Savannah.	Winyah Bay.
28. Average speed: (a) Light..... (b) Loaded..... (c) While dredging.....	8 knots. 7 knots. 1 to 2 knots. Two Babcock & Wilcox.....	9 knots. 5 knots. 1 to 2 knots. Two Scotch.....	8 knots. 5 knots. 1 knot. Two Scotch; three 42-inch furnaces, 286 tubes, 24 inches diameter.	9 knots. 8 knots. 1 and 2 knots. One Scotch marine.
29. Number and type of boilers.....				
30. Dimensions of boilers: (a) Diameter..... (b) Length..... (c) Heating surface (total). (d) Grate surface (total). (e) Boiler pressure (gauge).....	11 feet 7 inches wide, 10 feet 7 inches long. 11 feet 6 inches high. 3,400 square feet. 5,012 square feet. 125 square feet. Designed for 200 (used 145).	13 feet. 12 feet. 5,012 square feet. 125 square feet. 120 to 125 pounds. 35. 35.	14 feet. 12 feet. 5,392 square feet. 170 square feet. 120 pounds. 43. 43.	13 feet 6 inches. 12 feet. 2,450 square feet. 72.5 square feet. 116 pounds. 24. 24.
31. Number of men in crew.....	38 or 39.	35.	43.	24.
32. Number of men required to operate dredge with single crew.....	20.	35.	43.	24.
OPERATIONS.				
34. Location of dredging.....	San Pablo Bay	Savannah Harbor	Charleston Harbor, S. C. (outer bar?)	Winyah Bay, S. C.
35. Depth at mean low water before dredging.....	About 24 feet.	22 to 24 feet.	22 feet.	16 feet.
36. Depth at mean low water after dredging.....	No survey has been made.	22 to 27 feet.	Not available at this time.	18 feet.
37. Character of dredged material.....	Silt, 50 per cent; fine heavy sand, 50 per cent.	Sand, shell, and mud.	Sand, shell, clay, and mud.	Sand and mud.
38. Total number of miles run by dredge from work to dump, while loaded only, during year.....	1,429.76	684.	227.	1,493.
39. Total number of loads dredged during year.....	1,507.5	418.	227.	1,028.
40. Average distance from work to dump per load.....	0.9759 mile.	1.67 miles	1 mile.	1.46 miles.
41. Average number of loads dredged daily (count- ing days worked).....	14.35	3.84.	3.15	8.25.
42. Maximum amount in cubic yards dredged in one day.....	11,250.	5,610.	3,941.	3,240.
43. Maximum amount in cubic yards per load.....	520	935	994	300.
44. Average amount in cubic yards per load.....	491.16	941.3	795.65	278.8.
45. Average amount in cubic yards dredged per hour pumping—Item 47—Item 50a.....	540.3	609.9	578.66	360.
46. Maximum amount in cubic yards dredged per hour pumping.....	714.8	1,477	1,452	360.
47. Total amount in cubic yards dredged during year.....	740,457	364,461	178,320	285,300.

45. Maximum amount in cubic yards dredged in one month..... 177,980..... 96,020..... 59,146..... 66,040.
 46. Total amount in cubic yards dredged by this dredge in this locality..... 740,427..... 7,441,966..... 3,465,464..... 1,923,531.

DISTRIBUTION OF TIME AND VALUE OF LOST TIME.

	Hours.	Minutes.	Per-centage.	Hours.	Minutes.	Per-centage.	Hours.	Minutes.	Per-centage.	Hours.	Minutes.	Per-centage.
50. Time at work:												
(a) Pumping.....	1,370	22	39.977	646	40	7.363	308	10	3.51	792	30	9.02
(b) Turning in cut.....	27	4	789	10	35	120	103	40	1.19			
(c) To and from dump.....	416	35	12,138	201	13	2,201	132	55	1.51	297	32	3.39
(d) Dumping.....	94	55	2,765	82	55	603	19	45	.85	85	15	.97
(e) Taking fuel and supplies.....	96	11	2,803	143	24	1,633	58	45	.67	177	10	.31
(f) To and from wharf and anchorage.....	97	33	2,843	195	3	2,221	174	15	1.98	143	5	1.63
51. Time lost from work:												
(a) Bad weather.....	20	42	604	21	58	260	167	45	1.91	25	8	.29
(b) Ordinary repairs.....	305	25	8,900	102	53	1,171	71	35	.81	96		1.09
(c) Extraordinary repairs.....	360	56	10,516	91	10	1,037	934	50	10.64			
(d) Alterations and additions.....	63	40	1,856									
(e) Out of commission.....				4,920		56,011	4,440		50.55	4,200		47.81
(f) Lying at berths nights and after working hours.....				1,556	56	13,863	949	55	10.82	1,491	45	16.99
(g) Transferring from one district to another.....				141	13	1,008	6	25	.07	185	35	2.11
(h) Miscellaneous.....	578	37	16,899	600		6,831	1,416		16.13	1,440		16.39
(i) Sundays and holidays.....												
52. Total number of hours in year.....	8,784		100.000	8,784		100.000	8,784		100.00	8,784		100.00
53. Total time at work.....	2,102	40	61.24	1,249	50	14,229	797	30	9.08	1,345	32	15.32
54. Total time lost from work (exclusive of Sundays, holidays, and transfers), Item [51-(g+h)].....	750	43	21.87	6,934	10	78,940	6,570	30	74.80	5,098	28	66.29
55. Number of days upon which any dredging was done.....	105			109			72			124		
56. Average number of working hours per day.....	20 hours 1 minute.			11 hours 23 minutes.			11 hours 4 minutes.			10 hours 51 minutes.		
57. Maximum number of working hours per day.....	24 hours.			13 hours.			14 hours 30 minutes.			13 hours 28 minutes.		
58. Average time to dredge one load.....	54.64 minutes.			1 hour 32.8 minutes.			1 hour 21 minutes.			46.4 minutes.		
59. Average time to dump one load.....	3.77 minutes.			7.3 minutes.			6 minutes.			5 minutes.		
60. Average time spent going to and from dump.....	16.57 minutes.			28.9 minutes.			35 minutes.			17.4 minutes.		

TABLE IV.—Operations of seagoing dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Sea Pable.		Sacsennah.		Buster.		Wingsh Bay.	
	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.	Amount.	Percentage.
DISTRIBUTION OF COST AND PERCENTAGE OF TOTAL COST.								
61. Pay roll.....	\$11,797.13	35.487	\$11,038.55	39.084	\$11,008.69	33.85	\$7,672.98	42.72
62. Coal.....	5,235.29	16.145	5,176.31	18.331	5,200.28	15.99	4,772.61	13.44
63. Fuel oil.....	462.52	1.381	105.00	.372	83.94	.29	35.77	.20
64. Water.....	2,938.75	9.005	2,927.86	10.268	2,492.90	7.67	2,301.07	12.81
65. Supplies.....	1,320.54	3.972	1,293.92	4.637	1,738.63	5.23	263.28	1.49
66. Engine room.....	214.77	.645	840.85	2.977	1,118.23	3.44	268.08	1.49
67. Medicines and.....	641.07	1.928	2,403.45	8.512	686.53	2.13	268.08	1.31
68. Renewals of or additions to outfit.....								
69. Ordinary repairs.....	390.00	1.083	4.67	.016	299.79	.84	18.48	.10
70. Fuel.....	45.25	.136	1,180.93	4.183	1,098.13	3.20	96.77	.54
71. Machinery.....								
72. Extraordinary repairs.....	398.00	1.182			232.54	.72		
73. Alterations and additions.....	1,795.01	5.400	2,135.30	7.561	4,567.84	15.09		
74. Fuel.....	411.45	1.238						
75. Machinery.....	574.50	1.729						
76. Laundry and miscellaneous expenses, wharfage, etc.....	882.52	2.655	233.03	.695	372.51	1.14	272.41	1.53
77. Office expense.....	2,137.71	6.430	708.99	2.500	3,410.10	10.49	3,294.18	17.95
78. Surveys and superintendence.....	986.00	3.002	235.33	.693			766.67	4.23
79. Rental.....								
Total cost.....	33,243.52	100.000	28,238.21	100.000	33,516.11	100.00	17,961.38	100.00
74. Operating cost for year.....	\$29,528.59		\$23,975.99		\$22,716.71		\$13,865.28	
75. Cost per hour of time at work. Item 74 + Item 53.....	\$12,616		\$19.18		\$26.48		\$10.26	
76. Value of time lost (exclusive of Sundays, holidays, and transfer). Item 75 X Item 54.....	\$9,471.48		\$132,997.38		\$186,127.84		\$61,724.22	
77. Cost per cubic yard based on cost per hour of time at work (cents). Item 76 + Item 78.....	0.0968		6.077		12.737		4.86	
78. Average number of cubic yards dredged per hour of time at work = Item 47 + Item 53.....	359.14		315.6		223.59		212.08	
79. Cost per cubic yard with no repairs or additions (cents). [Total cost—(Items 67 + 68 + 69) ÷ Item 47.....	\$0.04007		0.268		14.65		0.265	

80. Cost per cubic yard with ordinary repairs (cents). [Total cost—(Items 66+67)+Item 47.]	0.04061	6.558	15.35	6.266.
81. Gross cost per cubic yard (cents). Total cost+Item 47.	4.489	7.189	18.23	6.266.
82. Total cost per yard mile (cents).	0.04600	4.287	18.23	4.34.
MISCELLANEOUS.				
83. Fuel consumed during year (long ton or barrel)	9,505.40 barrels	1,430.05 long tons.	980.35 long tons	800 long tons.
84. Average cost of fuel per long ton (or barrel).	\$6.8543 barrel	\$5,619 per long ton.	\$5.30 long ton	\$4,632.
85. Fuel consumed per yard of dredged material in pounds—Item 83÷Item 47.	4,1212	8.12	12.31	4.71.
86. Cost of water per 1,000 gallons.	\$1.163	85	15 and 25 cents.	25 cents.
87. Water purchased during year.	389,810 gallons.	31,000 gallons	327,442 gallons	145,080 gallons.
88. Total mileage of dredge during year.	5,949.44 miles.	3,636 miles.	1,302 miles.	6,226 miles.
<p>Remarks.</p> <p>From July 31 to Aug. 7, inclusive, wooden lining to hoppers was removed. A house was built at each end of bridge for protection of operators, and other minor deck repairs were made. The high-pressure cylinder of main engine was bored out, a new solid piston put in, and some minor repairs made to engine and machinery. On afternoon Aug. 7 dredge was taken to Oakland Creek and hauled out on the ways. On Aug. 8 and 9 hull was cleaned and painted 2 coats. Propeller was removed and the rubber sleeve around tail shaft taken out and a new one put in. The hopper gates were unsealed and put in condition for dredging. A derrick barge was hired for the purpose of putting up the suction pipes while dredge was at dock. The expense of the above repairs and outfitting was as follows:</p>				
	Derrick barge.....	\$127.00		
	Pay roll.....	800.60		
	Subsistence.....	206.04		
<p>Remarks.</p> <p>Machinery—Consisted of repairs to boiler and installing new grate equipment. Not docked during calendar year.</p> <p>Age of present sand pumps, 6½ years.</p> <p>Should run 6 months without new liners.</p> <p>This amount is exceptionally large on account of material being figured on time basis while pumping slush.</p> <p>Dredge laid up from Jan. 12, 1916, to Aug. 16, 1916, on account of lack of funds.</p>				
<p>Remarks.</p> <p>The dredge was laid up from lack of funds from Jan. 1 to Sept. 10 and under repairs from Sept. 11 to Sept. 20.</p>				
<p>Remarks.</p> <p>The dredge was laid up from lack of funds from Mar. 1 to Sept. 24, inclusive.</p>				

TABLE IV.—Operations of seagoing dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	San Pablo.	Sacramento.	Sanitar.	Wingah Bay.
	<i>Remerits—Continued.</i> Ways, cleaning, painting, and other repairs to hull..... 879.46 Removing liners to hoppers, building houses, calking after deck..... 645.81 Miscellaneous..... 112.53 2,771.44 This amount is not charged into the operations of dredge in San Pablo Bay as the dredge was not ready to operate until Aug. 10, and dredging was commenced on Aug. 11.			

TABLE V.

HYDRAULIC PIPE-LINE DREDGES.

4029

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916.

Name.....	A po.	Augusta.	Bacon Henry.	Barnard.
1. District.....	Rock Island, Ill.	Savannah, Ga.	Wilmington, N. C.	Jacksonville, Fla.
2. When built.....	1911-12	1911	1907	1904
3. Where built.....	Keokuk, Iowa.	Jacksonville, Fla.	Westlake, La.	Camden, N. J.
4. Builder.....	United States	Merrill-Stevens Co.	F. H. Swalls	New York Shipbuilding Co.
5. Time to build.....	About 1 year.	6 months.	Unknown.	Not known.
6. Material of hull.....	Wood and steel.	Steel	Wood	Steel
7. Contract cost of dredge.....	\$29,484.21.	\$17,875	\$124,000, including plant.	\$230,000
8. (a) Cost of outfit; (b) cost of pipe line.	(a) Included in 1; (b) \$7,340.88.	(a) \$2,572.90; (b) included in (a)	(a) Included in contract cost.	(a) Not known.
9. Length.....	130 feet.	74 feet.	150 feet 6 inches.	168 feet 8 inches.
10. Beam.....	28 feet.	28 feet.	39 feet.	33 feet.
11. Depth.....	5 feet.	4 feet 6 inches.	Box 15 feet, stern 12 feet 6 inches.	14 feet.
12. Draft:				
(a) Forward.....	39 inches.	2 feet 6 inches.	9 feet 9 inches.	8 feet.
(b) Aft.....	32 inches.	2 feet 6 inches.	7 feet 4 inches.	10 feet.
13. Displacement (long tons).....	263	140.3	1,410	1,291.
14. Number of crew.....	19 men.	19	48	54
15. Number, size, and type of propelling engines.....	No propelling engines.	None.	One 14 by 22½ by 36 inches; 36-inch stroke.	Two 12 by 18 by 30 by 18 inch triple expansion.
16. Number, size, and type of pumping engines.....	One 13 and 25 by 16 inch cross compound, condensing.	One 2-cylinder 8 by 8 inch vertical opposite crank directly connected to 10-inch dredge pump.	One 14 by 22½ by 36 inches; 36-inch stroke.	One 14 by 22½ by 40 inch triple expansion.
17. Cutter engines:	No cutter engines.	5 inches.	12 inches.	12 inches.
(a) Diameter of cylinders.....	(b) Stroke.....	8 inches.	14 inches.	14 inches.
18. Hauling engines:				
(a) Diameter of cylinders.....	(b) Stroke.....	7 inches.	10 inches.	8½ inches.
19. Bollers:				
(a) Number and type.....	3 Mississippi River type.	10 inches.	12 inches.	12 inches.
(b) Length.....	20 feet 2½ inches.	1 horizontal return tubular, underfired.	2 Heine water tube.	2 Scotch marine.
(c) Diameter.....	40 inches.	14 feet 1 inch.	19 feet 4 inches (drum).	18 feet.
(d) Heating surface (total).....	1,166 square feet.	3 feet 4 inches.	26 inches (drum).	11 feet.
(e) Grate surface (total).....	48.75 square feet.	1,110 square feet.	4,888 square feet.	4,688 square feet.
20. Discharge pipe in use (average number of feet).....	869 feet.	30 square feet.	108.5 square feet.	172 square feet.
21. Porticoes:				
(a) Number and material of those in use (average).....	18 inches.	480 feet.	1,500 feet.	1,350 feet.
(b) Dimensions.....	21 composite.	10 inches.	20 inches.	22 inches.
22. Pontoon:				
(a) Number and material of those in use (average).....	50 by 14 by 3.25 feet.	14 wooden pontoons.	65 wood.	Steel 23 by 9.5 by 3.9 feet; wood 20 by 8 by 4 feet.

23.	Revolutions per minute of propelling engines.	None.	165 to 170.	None.	176.
24.	Revolutions per minute of pumping engines.	235.	Spiral 6 feet. 8 inches. Round with hood. 11. 14. 106 to 175 pounds. Bituminous. 20 to 25 pounds. 12 to 14 inches.	160.	Revolving spiral. 6 feet 11 inches. 11. Round with hood. 146 pounds. Acron washed, Pockhantas, Stoneage, Lapsdale.
25.	Type of agitator or cutter head.	None.	Revolving tooth and blade.	None.	None.
26.	Diameter of cutter.	do.	3 feet.	None.	None.
27.	Diameter of cutter shaft.	do.	34 inches.	None.	None.
28.	Type of suction head.	Plain square.	Oblong.	None.	None.
29.	Revolutions per minute of cutter head.	No cutter head.	14.	None.	None.
30.	Average boiler pressure (gauge).	145 pounds.	80 pounds.	None.	None.
31.	Kind of coal used.	Bituminous lump.	Bituminous.	None.	None.
32.	Average gauge pressure in discharge pipe.	20.9 pounds.	16 pounds.	None.	None.
33.	Average vacuum in suction pipe.	18.9 inches.	17 inches.	None.	None.
ATTENDANT PLANT.					
Tugboat.					
34.	Name of tug attached to dredge.	None regularly.	None.	None.	None.
35.	Number of crew.	None.	None.	None.	None.
36.	Displacement.	None.	None.	None.	None.
37.	Drift.	(5) Forward. (6) Aft.	None.	None.	None.
Launches.					
38.	Name.	None.	Senses.	Faber.	Aladia.
39.	Length.	None.	30 feet 8 inches.	42 feet.	18 feet.
40.	Beam.	None.	3 feet 8 inches.	10 feet.	6 feet.
41.	Depth.	None.	3 feet 9 inches.	3 feet 8 inches.	3 feet.
42.	Drift.	None.	3 feet.	3 feet 6 inches.	4 feet.
43.	Displacement.	None.	8 tons.	10 tons.	0.15 ton.
Barges.					
44.	Identifying numbers of barges in use.	No. 499 and No. 499.	1.	B30, B11, No. 5 and No. 6.	B. 5.
45.	Usage.	Fuel floats.	Coal and water.	Fuel, water handling anchors, etc.	Water. Fuel. D. 5 c.
46.	Displacement, light (each).	50 long tons.	10 tons.	B10, 60; B11, 65; No. 5, 65; No. 6, 66 tons.	30 30 30
47.	Capacity of barges (each).	133 long tons.	25 tons.	B10, 80; B11, 90; No. 5, 90; No. 6, 90 tons.	50 50 50

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Apo.				Augusta.				Bacon Henry.				Bernard.			
	Hours.	Minutes.	Percent- age.		Hours.	Minutes.	Percent- age.		Hours.	Minutes.	Percent- age.		Hours.	Minutes.	Percent- age.	
WORK PERFORMED.																
48. Location of dredging.....	Mississippi River, Burlington to Hannibal.				Channel, Beaufort, S. C., to Savannah, Ga.; Savannah Harbor, Savannah River at Augusta, Ga.				Cape Fear River, N. C., at and below Wilmington, N. C.				Hillsboro Bay, Fla.			
49. Average depth before dredging.....	6.80 feet.....				3 to 5 feet.....				20 to 26 feet.....				17.6 feet.....			
50. Average depth after dredging.....	13.22 feet.....				5 to 8 feet.....				26 to 30 feet.....				23.9 feet.....			
51. Character of material dredged.....	Sand and gravel.....				Mud, sand, and gravel.....				Sand, mud, clay, and roots.....				Mud and sand, 48.1 per cent; clay, 33.2 per cent; loose rock, 18.7 per cent.			
52. Rate of advance per hour (in feet straight ahead).....	12.15 feet.....				13.04 feet (per hour pumping).....				8 to 12 feet.....				5.84 feet.....			
53. Amount dredged during the year.....	106,785 cubic yards.....				91,794 cubic yards.....				890,970 cubic yards.....				889,175 cubic yards.....			
54. Total amount dredged by this dredge at this locality.....	Same.....				785,855 cubic yards.....				3,748,508 cubic yards.....				389,175 cubic yards.....			
55. Average amount dredged: (a) Per hour (pumping).....	303.7 cubic yards.....				115.3 cubic yards.....				408 cubic yards.....				109.64 cubic yards.....			
(b) Per day.....	2,424 cubic yards.....				1,348.9 cubic yards.....				6,319 cubic yards.....				2,509.48 cubic yards.....			
56. Maximum amount dredged in one month.....	62,668 cubic yards.....				31,977 cubic yards.....				211,429 cubic yards.....				97,427 cubic yards.....			
57. Total number of days upon which any dredging was done.....	83.....				68.....				141.....				146.....			
58. Average number of working hours per working day.....	12 hours and 53 minutes.....				12 hours 26.7 minutes.....				20 hours 50 minutes.....				16 hours 39.1 minutes.....			
59. Maximum number of working hours per working day.....	16 hours.....				16.....				24 hours.....				23 hours 30 minutes.....			
DISTRIBUTION OF TIME.																
60. Time at work:	Hours.	Minutes.	Percent- age.		Hours.	Minutes.	Percent- age.		Hours.	Minutes.	Percent- age.		Hours.	Minutes.	Percent- age.	
(a) Pumping.....	644		7.33		791		9.011		2,184		24.87		2,038		23.1481	
(b) Handling pipe line.....	260	1	2.85		33	25	.867		113	55	1.26		192	40	2.1960	
(c) Handling swinging wires (cleaning suction).....	60	43	.68		22	20	.264		800		6.72		173	20	1.9722	
(d) Going to and from wharf or anchorage.....																
(e) Placing dredge.....	101	33	1.15						25	20	.29		62		0.0070	
(f) Waiting for vessels to pass.....									34	5	.26					
61. Time lost from work:	Hours.	Minutes.	Percent- age.		Hours.	Minutes.	Percent- age.		Hours.	Minutes.	Percent- age.		Hours.	Minutes.	Percent- age.	
(a) Changing location of plant.....	266	47	3.04		327	50	3.732		71		.81		300		4.0080	
(b) Bad weather.....	27	13	.81						122	15	1.73		360		4.0083	

(c) Washing boilers and ordinary repairs.									
	47	28	54	192	2,186	698	45	7.95	914
(d) Extraordinary repairs.....	25	44	29	571	6,800	3,672	.....	41.80	2,818
(e) Other causes.....	6,986	37	79.08	5,888	67,611	389	4.43	4.43	10
(f) Sundays and holidays.....	434	4.83	4.83	.....	10,109	864	.....	9.83	1,440
62. Total hours in year.....	8,784	.....	100.00	8,784	100.00	8,784	.....	100.00	8,784
63. Total time at work.....	1,066	17	12.01	866	15	2,987	.....	.....	2,461
64. Total time lost from work.....	7,717	43	87.89	7,917	45	5,847	.....	.....	30
COST OF WORK.									
<i>Dredge.</i>									
65. Pay rolls.....	84,766.02	.....	.....	85,103.11	.....	.....	.....	.....	130,184.79
66. Fuel for boilers.....	1,714.96	.....	.....	\$1,693.07	.....	.....	.....	.....	\$18,554.38
67. Coal for galley.....	4.96	.....	.....	.....	.....	.....	.....	.....	110.61
68. Water.....	.....	.....	.....	24.00	.....	.....	.....	.....	705.88
69. Supplies, subsistence.....	1,208.27	.....	.....	1,420.66	.....	.....	.....	.....	7,626.15
70. Supplies, engine room.....	283.04	.....	.....	363.31	.....	.....	.....	.....	3,049.20
71. Other supplies.....	778.80	.....	.....	425.33	.....	.....	.....	.....	2,008.04
72. Renewals or additions to outfit.....	124.14	.....	.....	1,443.22	.....	.....	.....	.....	5,461.18
73. Ordinary repairs:	.....	.....	.....	.....	.....	.....	.....	.....	.....
(5) Hull.....	.....	.....	.....	105.11	.....	.....	.....	.....	5,692.45
(6) Machinery (exclusive of main dredging pump).....	.....	6.41	.....	373.06	.....	.....	.....	.....	5,460.38
74. Laundry, ice, miscellaneous expenses.....	457.27	.....	.....	111.83	.....	.....	.....	.....	924.58
75. Total.....	89,326.36	.....	.....	\$10,962.60	.....	.....	.....	.....	\$80,076.74
<i>Main dredging pump.</i>									
76. Diameter of runner.....	50 inches	.....	.....	30 inches	.....	84 inches	.....	.....	7 feet.
77. Volume (lined or unlined).....	Lined front and back only	.....	.....	Unlined.....	.....	Unlined.....	.....	.....	Unlined.
1 34,307 cubic yards channel Beaufort, S. C., to Savannah, Ga.; 2,970 cubic yards Savan- nah Harbor; 54,447 cubic yards Savannah River at Augusta, Ga. 2 Dredge laid up from Jan. 1, 1916, to May 8, 1916, and from June 6, 1916, to Sept. 10, 1916. 3 316 tons, at \$4.97. 4 4,800 gallons, at \$5 per 1,000.									
1 2,985.23 tons of 2,000 pounds, at \$4.76. 2 15.9 tons, at \$4.76.									
1 52 men. 2 4,205.33 tons, at \$4.4112. 3 31,664 tons, at \$3.5490. 4 1,018,330 gallons, at 73.165 cents per 1,000.									

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Apo.				Augusta.				Beacon Henry.				Barnard.			
	Number pumped.	Number pumping hours used.	Total cost.		Number pumped.	Number pumping hours used.	Total cost.		Number pumped.	Number pumping hours used.	Total cost.		Number pumped.	Number pumping hours used.	Total cost.	
78. Renewals:																
(a) Valve.....																
(b) Runner.....					11				11				1		\$1,220.00	
(c) Valve liners.....															116.95	
(d) Runner liners.....															150.71	
(e) Head and back liners.....					2				2						317.61	
79. Miscellaneous repairs.....																
80. Total.....							\$4,570.00				\$4,570.00					\$1,575.27
81. Renewals: Pipe line.																
(a) Rubber sleeves.....													20		\$1,095.40	
(b) Pipe.....	9		\$252.80						24	200	\$690.00				2,260.04	
(c) Packings.....			32.32													
(d) Outfit.....			11.40								575.68				1,592.88	
82. Repairs.....															268.05	
83. Miscellaneous.....																
84. Total.....			308.02				568.57				1,275.68				6,148.54	
Towboats and launches.																
85. Pay rolls.....			\$1,071.53								\$2,157.50				\$1,045.60	
86. Fuel for boilers.....			39.68								\$1,798.25				778.42	
87. Coal for galley.....			7.24								99.60					
88. Water.....																
89. Supplies, subsistence.....			167.46												46.27	
90. Supplies, engine room.....			6.40												64.84	
91. Launch supplies.....			67.53								27.56				1.15	
92. Other supplies.....																
93. Renewals of or additions to outfit.....							26.26								112.96	

94. Ordinary repairs.....	14.94	9.56	73.77	382.97
95. Laundry, ice, miscellaneous expenses, etc.....	3.00		380.24	77.43
96. Total.....	\$1,376.98		4,536.32	2,504.63
<i>Barges (amounts chargeable to dredge).</i>				
97. Ordinary repairs to barges.....	\$13.78		\$409.37	\$67.30
98. Miscellaneous expenses.....				\$4,204.55
99. Total field cost.....				
100. Total field cost per cubic yard, (cents).....	\$0.0561	12.845 cents	58,907.09	\$0.2430
<i>Extra expenses.</i>				
101. Office expenses, superintendence, surveys, etc.....	\$2,269.38	\$474.67	\$9,983.50	\$12,270.51
102. Extraordinary repairs to dredge: (a) Hull.....		\$2,029.47	438.20	5,057.43
(b) Machinery (exclusive of main dredging pump).....	\$1,656.03	101.07	1,148.86	9,201.65
103. Extraordinary repairs to towboats and launches.....		419.57		186.65
104. Extraordinary repairs to barges.....		132.69		1,264.37
105. Total.....				28,080.50
106. Gross cost per cubic yard (cents).....	7.6	16.288	70,422.74	122,655.83
MISCELLANEOUS.				
107. Number of pounds of fuel per yard of material.....	6.28 pounds	7.71	6.63 pounds	22.961
108. Fuel consumed by dredge, tons or barrels.....	634.47 tons	316 long tons	2,965.22 tons of 2,000 pounds	4,237,466.4 tons.
109. Fuel consumed by auxiliary plant, tons or barrels.....	8.07 tons	1,372 gallons kerosene; 190 gal- lons gasoline.	7,823 gallons gasoline, 30 tons coal	3,492 gallons gasoline.
110. Cost of fuel.....	\$2.61 per ton approximately	\$1,721.45	\$15,982.46	Coal, \$4.4112 per ton; gasoline, 0.2314 cents per gallon.
111. Water purchased.....	None	4,800 gallons.	None	1,018,330 gallons.
112. Cost of water per 1,000 gallons.....	None	\$6	None	78.156 cents per thousand.
113. Cost per cubic yard per hour at work.....	None	10,086 cents	None	\$0.2418.
114. Linear feet of pipe line built during year and cost per linear foot.....	None	None	None	2,300 feet, \$2.44, average.
115. Linear feet of embankment built dur- ing year and cost per linear foot.....	None	None	None	2,925 feet, \$0.5196.

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	A po.	Augusta.	Bacon Henry.	Barnard.
MISCELLANEOUS—continued.				
116. Area in square feet cut over by dredge during year.	847,800.....	1,017,500.....	3,007,750.....	1,784,250 square feet.
117. Average increase of depth of channel cut over.	6.31.....	2.44 feet.....	6.51.....	6.3 feet.
	<p><i>Remarks.</i></p> <p>¹ In commission 106 days, dredging channel and filling base of the sand dams in the Mississippi River in the vicinity of Alexandria and Gregory, Mo.</p> <p>² Includes pontoons.</p> <p>³ Winter repairs to dredge, winter of 1915-16.</p> <p>⁴ Fuel (coal) purchased by the short ton of 2,000 pounds.</p>	<p><i>Remarks.</i></p> <p>¹ Fuel for engines.</p> <p>² Quarters were constructed on a second deck to replace attached quarter boat.</p>	<p><i>Remarks.</i></p> <p>¹ Twenty-four rubber sleeves were purchased in December 1916, but 6 had been put in use by Dec. 31, 1916.</p> <p>² Five men.</p> <p>³ 7,823 gallons gasoline at 22.98 cents.</p> <p>⁴ A complete new pump was purchased and installed, including volute, runner, back and front heads and liners and suction throat for a lump sum of \$4,570.</p> <p>⁵ The separate labor cost of work done by crew is \$1,250 and is included in item No. 60.</p> <p>⁶ The separate labor cost on side of that furnished by the crew is \$632.05, and is included in item No. 70.</p> <p>⁷ Fuel for the boilers on the dredge has been purchased by short tons.</p> <p>⁸ Fuel for the launches has been purchased by the gallon.</p>	<p><i>Remarks.</i></p> <p>¹ Of the 20 sleeves purchased, 3 are in good condition after 1,316 hours in use, 7 burst in average 595 hours, 2 burst in average 911 hours and balance are either new or very slightly used.</p> <p>² Cost of barges, B4 and B5, constructed during the year.</p> <p>³ Cost of building levee, \$1,520.02, included in dredge pay roll.</p>

Name.....	Bids.	Blackwater.	Oystered.	Callio.
1. District.....	St. Louis, Mo., Mississippi River Commission.	Montgomery, Ala.....	Philadelphia, Pa.....	First, Portland, Ore.
2. When built.....	1896.....	Completed June 20, 1911.....	1905.....	1916.....
3. Where built.....	Pittsburgh, Pa.....	Pine Barren, Fla.....	Baltimore, Md.....	Big Eddy, Ore.
4. Builder.....	Judson W. Bates.....	U. S. Engineer Department.....	Ellcott Machine Corporation.....	Constructed by hired labor.
5. Time to build.....	11 months.....	14 months to build and install machinery.....	.....	3 months.....
6. Material of hull.....	Steel.....	Wood.....	Wood.....	Wood.....
7. Contract cost of dredge.....	\$172,775.....	\$35,280.23.....	\$80,600.....	\$5,000. ¹
8. (a) Cost of outfit; (b) cost of pipe line.....	.....	(a) \$5,881.28.....	(a) \$5,450.17; (b) \$8,761.11.....	(a) From dredge Wallowa.
9. Length.....	214 feet.....	110 feet.....	140 feet 6 inches.....	76 feet.....
10. Beam.....	58 feet.....	32 feet.....	40 feet 4 inches.....	22 feet.....
11. Depth.....	6 feet 11 inches.....	10 feet 7 inches.....	10 feet 7 inches.....	4 feet 4 inches.....
12. Draft.....	(a) Forward.....	54 feet.....	6 feet 2 inches.....	18 inches.....
(b) Aft.....	4 feet 2 inches.....	5 feet.....	6 feet 6 inches.....	21 inches.....
13. Displacement (long tons).....	1,300.....	433.....	886.....	64.....
14. Number of crew.....	56.....	24.....	24.....	6.....
15. Number, size, and type of propelling engines.....	None.....	None, nonpropelling.....	None.....	None.....
16. Number, size, and type of pumping engines.....	Two 204, 33, and 38 inch by 24-inch stroke; vertical, triple expansion, condensing.....	One 12 and 24 by 14-inch stroke, inverted compound, condensing.....	One 12 by 23 and 33 by 20 inches; triple expansion.....	One Morris double engine, 7 by 7.....
17. Cutter engines: (a) Diameter of cylinders..... (b) Stroke.....	None.....	104 inches..... 104 inches.....	11 inches..... 14 inches.....	None.....
18. Hauling engines: (a) Diameter of cylinders..... (b) Stroke.....	7 inches..... do.....	7 inches..... 10 inches.....	10 inches..... 14 inches.....	None.....
19. Boilers: (a) Number and type..... (b) Length..... (c) Diameter..... (d) Heating surface (total)..... (e) Grate surface (total).....	4, Heine water tube..... 19 feet, 6 inches..... 10 feet, 7 inches width..... 10,612 square feet..... 216 square feet.....	2 Scotch marine..... 14 feet, 5 inches..... 8 feet..... 2,200 square feet..... 48 square feet.....	Two Scotch marine..... 12 feet..... 11 feet 4 inches..... 3,033 square feet..... 98 square feet..... 2,000 feet.....	One locomotive type..... 14 feet, 10 inches..... 5 feet, 54 inches..... 820 square feet..... 22 square feet..... 47 feet.....
20. Discharge pipe in use (average number of feet).....	33 inches.....	15 inches.....	20 inches.....	8 inches.....
21. Diameter of discharge pipe.....	.....	.....	.....	.....
22. Pontoon: (a) Number and material of those in use (average)..... (b) Dimensions.....	16; wood..... 6 feet by 16 feet by 26 inches..... None.....	16; wood..... 6 feet by 16 feet by 26 inches..... None.....	12 to 18; wood..... 20 feet long, 18 feet wide, 2 feet 6 inches deep.....	None..... None..... 365.....
23. Revolutions per minute of propelling engines.....	.....	.....	.....	.....
24. Revolutions per minute of pumping engines.....	.....	.....	.....	.....

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Beta.	Blackwater.	Cutwater.	Cuttings.
25. Type of agitator or cutter head.....	Water-jet agitator.....	Cutter head, spiral type.....	Spiral.....	Water jet.
26. Diameter of cutter.....		6 feet 8 1/2 inches diameter over blades.....	5 feet 5 inches.....	
27. Diameter of cutter shaft.....	Upstream, with water jet.....	64 inches.....	74 inches.....	Drag head.
28. Type of suction head.....		Suction from within cutter head.....	6.....	110 pounds.
29. Revolutions per minute of cutter head.....		16.....	Plain, round.....	Semistatiminous.
30. Average boiler pressure (gauge).....		137 pounds.....	186 pounds.....	12 pounds.
31. Kind of coal used.....		Birmingham.....	Semistatiminous.....	4 inches.
32. Average gauge pressure in discharge pipe.....		16 pounds.....	30 pounds.....	
33. Average vacuum in suction pipe.....		6 to 7 inches.....	16 inches.....	
ATTENDANT PLANT.				
Towboat.				
34. Name of tug attached to dredge.....		None.....	Camden.....	None.
35. Number of crew.....			8.....	
36. Displacement.....			170 tons.....	
37. Draft.....			7 feet.....	
(c) Forward.....			8 feet.....	
(d) Aft.....				
Launches.				
38. Name.....		Shearwater.....	New Castle.....	None.
39. Length.....		40 feet.....		
40. Beam.....		21 feet.....	24 feet 6 inches.....	26 feet.....
41. Depth.....		8 feet.....	7 feet.....	8 feet.....
42. Draft.....		4 feet 6 inches.....	26 inches.....	44 inches.....
43. Displacement.....		3 feet 6 inches.....	36 inches.....	26 inches.....
		4 tons.....	1 1/2 tons.....	4 1/2 tons.....
Barges.				
44. Identifying numbers of barges in use.....	37, 38, and 41.....		8, 5, and 6.....	None.
45. Usage.....	Coal, supplies, and equipment.....		Coal, garbage, and waste.....	
46. Displacement, light (each).....	No. 37, 123 tons; No. 38, 133 tons; No. 41, 90 tons.....		320, 40, and 60 tons.....	
47. Capacity of barges (each).....			No. 3, 140 tons; No. 6, 35 tons.....	

WORK PERFORMED.		See remarks.....				Delaware River, below Philadelphia, Pa.				Dallas-Caddo Canal.			
		Hours.	Minutes.	Percentage.		Hours.	Minutes.	Percentage.		Hours.	Minutes.	Percentage.	
48.	Location of dredging.....												
49.	Average depth before dredging.....												
50.	Average depth after dredging.....												
51.	Character of material dredged.....												
52.	Rate of advance per hour (in feet straight ahead).....												
53.	Amount dredged during the year.....												
54.	Total amount dredged by this dredge at this locality.....												
55.	Average amount dredged: (a) Per hour (pumping)..... (b) Per day.....												
56.	Maximum amount dredged in 1 month.....												
57.	Total number of days upon which any dredging was done.....												
58.	Average number of working hours per working day.....												
59.	Maximum number of working hours per working day.....												
DISTRIBUTION OF TIME.													
60.	Time at work:												
	(a) Pumping.....												
	(b) Handling pipe line.....												
	(c) Handling swinging wires (cleaning suction).....												
	(d) Going to and from wharf or anchorage.....												
	(e) Placing dredge.....												
	(f) Waiting for vessels to pass.....												
61.	Time lost from work:												
	(a) Changing location of plant.....												
	(b) Bad weather.....												
	(c) Washing boilers and ordinary repairs.....												
	(d) Extraordinary repairs.....												
	(e) Other causes.....												
	(f) Sundays and holidays.....												
62.	Total hours in year.....	8,784		100.00		8,784		100.00		8,784		100.00	
63.	Total time at work.....					888		9.54		6,788		23.16	
64.	Total time lost from work.....	8,784		100.00		7,946		90.46		2,250		76.84	

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Beta.	Blackwater.	Outerco.	Cello.
COST OF WORK.				
<i>Dredge.</i>				
65. Pay rolls.....	.....	\$9,350.91	\$13,825.87	\$1,000.75
66. Fuel for boilers.....	.....	\$3,063.97	13,908.51	\$1,207.72
67. Coal for galley.....	.....	\$24.89	123.64	.....
68. Water.....	.....	125.00	172.37	.....
69. Supplies, subsistence.....	.....	2,146.78	3,983.91	.....
70. Supplies, engine room.....	.....	380.54	628.24	34.32
71. Other supplies.....	.....	181.80	306.21	1.64
72. Renewals or additions to outfit.....	.....	2,080.00	1,212.58	76.80
73. Ordinary repairs:	.....	.....	.....	.....
(a) Hull.....	\$917.67	185.57	125.51	.....
(b) Machinery (exclusive of main dredging pump).....	539.23	31.00	91.46	.....
74. Laundry, ice, miscellaneous expenses.....	.....	793.46	309.86	.....
75. Total.....	\$1,456.90	\$18,244.52	\$24,486.16	\$2,967.23
<i>Main dredging pump.</i>				
76. Diameter of runner.....	84 inches	90 inches	6 feet	30 inches
77. Volume (lined or unlined).....	Unlined.	Unlined.	Lined.	Lined.

	Renewals:			Pipe line.			Torboats and launches.					
	Number pur- chased.	Number pumping hours used.	Total cost.	Number pur- chased.	Number pumping hours used.	Total cost.	Number pur- chased.	Number pumping hours used.	Total cost.	Number pur- chased.	Number pumping hours used.	Total cost.
78. Renewals:												
(a) Volute.....	1		\$436.45									
(b) Runner.....												
(c) Volute liners.....	4		144.80									
(d) Runner liners.....	5		214.08									
(e) Head and back liners.....												
79. Miscellaneous repairs.....												
80. Total.....			\$795.23									\$917.09
81. Renewals:												
(a) Rubber sleeves.....												
(b) Pipe.....												
(c) Pontoons.....												
(d) Outfit.....												
82. Repairs.....			117.47									
83. Miscellaneous.....												
84. Total.....			117.47									2,340.44
85. Pay rolls.....			\$937.50									\$1,698.24
86. Fuel for boilers.....			\$844.31									\$303.03
87. Coal for galley.....												
88. Water.....												
89. Supplies, subsistence.....			192.04									648.24
90. Supplies, engine room.....												52.94
91. Launch supplies.....			101.23									381.12
92. Other supplies.....												113.14
93. Renewals of or additions to outfit.....												
94. Ordinary repairs.....			94.47									64.09
95. Laundry, ice, miscellaneous expenses, etc.....												21.61
96. Total.....			\$2,162.55									\$3,255.60

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name	Bda.	Blackwater.	Cataract.	Catilo.
<i>Barges (amounts chargeable to dredge).</i>				
97. Ordinary repairs to barges.....	\$23.05	.....
98. Miscellaneous expenses.....
99. Total field cost.....	\$21,326.82	.....	\$2,987.23
100. Total field cost per cubic yard (cents). <i>Extra expenses.</i>	0.0727	31,023.94 2.47	0.1903
101. Office expenses, superintendence, surveys, etc. 102. Extraordinary repairs to dredge: (a) Hull..... (b) Machinery (exclusive of main dredging pump)..... 103. Extraordinary repairs to towboats and launches..... 104. Extraordinary repairs to barges.....	\$330.84	3,568.31 651.87 2,357.19 142.15 130.23	.........................
105. Total.....	22,166.66	6,869.75	2,987.23
106. Gross cost per cubic yard (cents)	7.56	3.02	19.03.
MISCELLANEOUS.				
107. Number of pounds of fuel per yard of material.....	5.94 pounds.	2.4	23.8.
108. Fuel consumed by dredge, tons or barrels.....	780.9	1,322	192.25 tons coal.
109. Fuel consumed by auxiliary plant, tons or barrels.....	3,758.5 gallons gasoline	50 tons (derrick snow), 1,650 gallons gasoline (launches)	
110. Cost of fuel.....	\$3,983.17	Coal, \$2.95; gasoline, 22 cents per gallon.	\$8,282 per short ton.
111. Water purchased.....	25,600 gallons.	241,233 gallons.	None.
112. Cost per cubic yard per hour at work.....	\$1.	30 cents.	None.
113. Linear feet of pipe line built during year and cost per linear foot.....	\$0.0645	\$0.0145	\$0.048.
114. Linear feet of embankment built during year and cost per linear foot.....		640 feet; \$2.19 per foot.	None.
115. Linear feet of embankment built during year and cost per linear foot.....			Do.

<p>116. Area in square feet cut over by dredge during year. 117. Average increase of depth of channel cut over.</p>	<p>Remarks.</p>	<p>2,387,500 4 feet.</p>	<p>Remarks.</p>	<p>130,940. 3 feet 3 inches. Remarks.</p>
<p>No dredging done by this dredge during year.</p>	<p>Remarks.</p>	<p>2,387,500 4 feet.</p>	<p>The dredge was engaged in re-handling material deposited in a basin by the dredges Delaware and Manhattan at Arthurdale Island, Delaware River, from Apr. 4 to Nov. 5, 1916. From Nov. 5, 1916, to Dec. 31, 1916, she was engaged in filling new wharves and bulkhead at Fort Mifflin, Philadelphia, Pa., with material dredged from between and below the piers and in re-handling suitable material deposited at the piers by the U. S. dredge Delaware. During this period 49,232 cubic yards of sand and gravel were placed in and behind the piers. 1 1,322 tons, at \$2,955. 2 8 tons, at \$2,955. 3 241,233 gallons, at \$0.30 per 1,000. 4 Not used. 5 7 men. 6 90 tons, at \$3.23.</p>	<p>Coal purchased by short ton. 1 Estimated value, using second-hand equipment. 2 Includes night. 3 Dredge built and placed in commission on Sept. 1. 4 1924 tons, at \$6.282.</p>
	<p>Remarks.</p>	<p>2,387,500 4 feet.</p>	<p>1 Narrows in Santa Rosa Sound, Fla. 2 Blackwater River, Fla. 3 Apalachicola Bay, Fla. 4 Channel from Apalachicola River to St. Andrews Bay, Fla. This plant operated in the Narrows in Santa Rosa Sound from Jan. 17, 1916, until Feb. 10, 1916, and was then transferred to Blackwater River, Fla., where she began work on Feb. 16, 1916, and continued work until Apr. 20, 1916. She was then tied up, owing to lack of funds, until Oct. 21, 1916, when she began work in Apalachicola Bay, Fla., continuing until Nov. 24, 1916. She was then transferred to the channel from Apalachicola River to St. Andrews Bay, Fla., beginning work on Dec. 1, 1916, and continuing until Dec. 22, 1916, when work was suspended owing to lack of funds. No separating labor cost kept. Fuel purchased by long tons. 1 780.9 tons. 2 6 tons. 3 26,000 gallons, at \$1 per 1,000. 4 3 men. 5 3,782.5 gallons, at \$0.225.</p>	

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Clinton De Witt.	Congerree.	Craigdon.
1. District.....	First New York.....	Charleston, S. C.....	Savannah, Ga. 1914-15.
2. When built.....	1913.....	1907-8; rebuilt 1914.....	Charleston, S. C.
3. Where built.....	Baltimore, Md.....	Georgetown, S. C.; rebuilt Charleston, S. C.	United States navy yard.
4. Builder.....	Ellisott Machine Corporation.....	U. S. Engineer Department; re- built by Valk & Murdoch Co.	13 months.
5. Time to build.....	6 months.....	15 months; rebuilt 9 months.....	Steel.
6. Material of hull.....	Wood.....	Steel.....	\$39,390.86.
7. Contract cost of dredge.....	\$62,628.....	\$30,200; rebuilding \$3,800.77.....	(a) \$2,368.06; (b) \$2,567.50.
8. (a) Cost of outfit; (b) cost of pipe line.....	(a) \$3,400; (b) \$10,776.....	(a) \$1,486; (b) no record.....	80 feet.
9. Length.....	95 feet.....	104 feet.....	30 feet.
10. Beam.....	27 feet 6 inches.....	32 feet.....	6 feet.
11. Depth.....	8 feet 6 inches.....	6 feet.....	3 feet 6 inches.
12. Draft: (a) Forward..... (b) Aft.....	6 feet 6 inches..... 6 feet.....	2 feet 6 inches..... 2 feet 9 inches.....	3 feet 3 inches.
13. Displacement (long tons).....	393.....	430.....	221 tons.
14. Number of crew.....	42.....	13.....	23.
15. Number, size, and type of propelling engines.....	None.....	Nonpropelling.....	None.
16. Number, size, and type of pumping engines.....	One 12 and 24 by 14 inch fore and aft, compound.....	One 10 by 20 by 10, fore and aft, compound.....	1 vertical double expansion, 12 and 24 by 14 inch stroke.
17. Cutter engines: (a) Diameter of cylinders..... (b) Stroke.....	24 inches..... 12 inches.....	7 inches..... 10 inches.....	7½ inches.
18. Hauling engines: (a) Diameter of cylinders..... (b) Stroke.....	7 inches..... 10 inches.....	7 inches..... 10 inches.....	7½ inches.
19. Bollers: (a) Number and type..... (b) Length..... (c) Diameter..... (d) Heating surface (total)..... (e) Grate surface (total).....	1 Heine water tube..... 16 feet..... 11 feet..... 2,764 square feet..... 67 square feet.....	2 locomotive..... 21 feet 1 inch..... 5 feet..... 967 square feet each boiler..... 27 square feet each boiler..... 450 feet.....	1 Scotch with two 36-inch tur- nakes..... 13 feet..... 9 feet..... 1,319 square feet..... 36 square feet..... 667 feet.....
20. Discharge pipe in use (average number of feet).....	700 feet.....	12 inches.....	12 inches.
21. Diameter of discharge pipe.....	16 inches.....	5, wood.....	18, wooden pontoons.
22. Pontoons: (a) Number and material of those in use (average)..... (b) Dimensions.....	30, wood..... 14 by 4 feet 10 inches by 3 feet 4 inches.....	Length, 16 feet; beam, 8 feet; depth, 20 inches.....	12 by 18 feet by 26 inches.

22. Revolutions per minute of propelling engine.	None.	None.	None.
24. Revolutions per minute of pumping engine.	250.	250.	250.
25. Type of agitator or cutter head.	Taylor-Wharton (manganese).	Elliptic spiral.	Revolving blade and tooth.
26. Diameter of cutter.	5 feet.	5 feet.	4 feet.
27. Diameter of cutter shaft.	6 inches.	4½ inches.	4½ inches.
28. Type of suction head.	Elliptical.	Plain round.	Oblong.
29. Revolutions per minute of cutter head.	12.	7.	14.
30. Average boiler pressure (gauge).	160 pounds.	90 pounds.	150 to 125 pounds.
31. Kind of coal used.	Bituminous.	Bituminous, Clinchfield run of mine.	Bituminous.
32. Average gauge pressure in discharge pipe.	20 pounds.	18 pounds.	25 pounds.
33. Average vacuum in suction pipe.	7 inches.	15 inches.	20 inches.
ATTENDANT PLANT.			
Tow boat.			
34. Name of tug attached to dredge.	None.	Richland.	None.
35. Number of crew.	4.	4.	
36. Displacement.	34 long tons.	78.7 long tons.	
37. Draft:			
(a) Forward.	5 feet.	1 foot 6 inches.	
(b) Aft.	6 feet 5 inches.	2 feet 3 inches.	
Launches.			
38. Name.	Bulls B (hired).	Tree-Roe.	Braunswick.
39. Length.	40 feet.	31 feet.	60 feet.
40. Beam.	10 feet 4 inches.	10 feet 6 inches.	15 feet.
41. Depth.	5 feet 9 inches.	23 inches.	6 inches.
42. Draft.	4 feet 3 inches.	24 inches.	4 feet 5 inches.
43. Displacement.	6 tons.	2 long tons.	4½ tons.
Barges.			
44. Identifying numbers of barges in use.	No. 22 and No. 37, Hudson River.	1.	Coal lighters 1 and 2.
45. Usage.	Coaling.	Hauling coal.	Coal and water. Handling ash, etc.
46. Displacement, light (each).	35 and 35 tons.	7 tons.	{No. 1—61 tons...} {No. 2—7 tons.
47. Capacity of barges (each).	200 and 70 tons.	30 tons.	{No. 3—19.5 tons.
WORK PERFORMED.			
48. Location of dredging.	Hudson River, N. Y.	Compans River, B. C.	(1).
49. Average depth before dredging.	-5.7 L. W.	1 foot.	5 to 16 feet (according to locality).
50. Average depth after dredging.	-11.3 L. W.	4 feet.	8 to 18 feet (according to locality).

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Clinton De Wilt.						Congaree.			Creighton.		
	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
WORK PERFORMED—continued.												
51. Character of material dredged.....												
52. Rate of advance per hour (in feet straight ahead).....												
53. Amount dredged during the year.....												
54. Total amount dredged by this dredge at this locality.....												
55. Average amount dredged: (a) Per hour (pumping).....												
56. Maximum amount dredged in one month.....												
57. Total number of days upon which any dredging was done.....												
58. Average number of working hours per working day.....												
59. Maximum number of working hours per working day.....												
DISTRIBUTION OF TIME.												
60. Time at work:												
(a) Pumping.....	3,578	10	42.21									
(b) Handling pipe line.....	642	55	7.76									
(c) Handling swinging wire (cleaning suction).....	46	15	.56		(1)							
(d) Going to and from wharf or anchorage.....												
(e) Placing dredge.....	70	15	.85									
(f) Waiting for vessels to pass.....	11	30	.14									
61. Time lost from work:												
(a) Changing location of plant.....	265	35	3.09									
(b) Bad weather.....	98	30	1.19	72		14.28						
(c) Washing boilers and ordinary repairs.....	168	15	2.08									
(d) Extraordinary repairs.....	474	30	5.73									
(e) Other causes.....	1,892	5	19.22	336	(1)	168.69						
(f) Sundays and holidays.....	1,352	96	16.22	96		19.05						
62. Total hours in year.....	8,794		100.00			100.00						
63. Total time at work.....	4,349	5	52.52	8,784		99.99						
64. Total time lost from work.....	3,930	55	47.48	504		100.00						

COST OF WORK.

Dredge.

65. Pay roll.....	\$21,595.14
66. Fuel for boilers.....	\$11,564.87
67. Coal for galley.....	\$1,101.70
68. Water.....	5.00
69. Supplies, subsistence.....	6,362.47
70. Supplies, engine room.....	1,004.49
71. Other supplies.....	1,185.21
72. Renewals or additions to outfit.....	10,461.56
73. Ordinary repairs:	
(a) Hull.....	215.50
(b) Machinery (exclusive of main dredging pump).....	224.70
74. Laundry, ice, miscellaneous expenses.....	547.84
75. Total.....	\$64,864.48

Main dredging pump.

76. Diameter of runner.....	5 feet.
77. Volume (lined or unlined).....	Lined.

\$1,705.68	
\$1,112.68	
\$1,215.11	
\$16.88	
.....	
\$1.80	
\$,015.83	
\$40.66	
\$23.34	
\$,083.22	
45.32	
432.85	
487.46	
\$23,759.34	

\$2,928.19

\$9,034.64

\$23,759.34

	5 feet.			5 feet.			60 inches.		
	Number pur- chased.	Number pumping hours used.	Total cost.	Number pur- chased.	Number pumping hours used.	Total cost.	Number pur- chased.	Number pumping hours used.	Total cost.
78. Renewals:									
(a) Volute.....			\$1,000.00						
(b) Runner.....									
(c) Liners.....									
(d) Runner liners.....									
(e) Head and back liners.....									
79. Miscellaneous repairs.....									
80. Total.....			\$1,000.00						
Pipe line.									
81. Renewals:									
(a) Rubber sleeves.....			\$158.75						
(b) Pipe.....									
(c) Pontoon.....			11.83						
(d) Outfit.....									
82. Repairs.....			181.52						
83. Miscellaneous.....									
84. Total.....			\$382.09						
						\$8,291.40			\$908.16
									192.00
									559.64
									900.00
									5.46
									746.93
									222.34
									\$1,880.44

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Clinton De Witt.	Congress.	Creditors.
<i>Towboats and launches.</i>			
85. Pay rolls.....	.....	\$204.50	\$1,956.23
86. Fuel for boilers.....	.....	50.00	\$1,905.54
87. Coal for galley.....	.....	18.00	.....
88. Water.....	.....	.....	585.00
89. Supplies, subsistence.....	.....	52.50	399.92
90. Supplies, engine room.....	.....	.....	.....
91. Launch supplies.....	.....	\$341.01	201.37
92. Other supplies.....	.....	.....	339.10
93. Renewals of or additions to outfit.....	.....	.....	537.94
94. Ordinary repairs.....	.....	.....	8.12
95. Laundry, ice, miscellaneous ex- penses, etc.....	.....	.36	.....
95. Total.....	\$3,826.01	\$357.36	\$2,343.98
<i>Barges (amounts chargeable to dredge).</i>			
97. Ordinary repairs to barges.....	60.09	.....	92.57
98. Miscellaneous expenses.....	22.02	445.54	.....
99. Total field cost.....	82.11	.....	.....
100. Total field cost per cubic yard (cents).....	0.1728	60,220.69	12,737.52
<i>Extra expenses.</i>			
101. Office expenses, superintendence, surveys, etc.....	6,131.26	1,756.21	2,125.85
102. Extraordinary repairs to dredge:	.....	.....	.....
(a) Hull.....	.....	.....	1,914.94
(b) Machinery (exclusive of main dredging pump).....	.....	.....	1,248.55
103. Extraordinary repairs to towboats and launches.....	.....	.....	354.31
104. Extraordinary repairs to barges.....	.....	.....	1,187.54
105. Total.....	66,361.97	10,324.16	28,550.97
106. Gross cost per cubic yard (cents).....	19.03	19.02	6.340.

107. Number of pounds of fuel per yard of material.	15.56 pounds.	6.516 pounds.	4.34 pounds.	
108. Fuel consumed by dredge, tons or barrels.	2.453 tons.	222.41 tons coal and 50 cords wood.	1,551.56 tons coal.	
109. Fuel consumed by auxiliary plant, tons or barrels.	161.	2,945 gallons gasoline and 2,091 gallons kerosene.	9,744 gallons gasoline, 7,332 gal- lons kerosene.	
110. Cost of fuel.	\$12,093.57.	Coal: \$5.50 per ton, \$1,218.11.	\$6,330.23.	
111. Water purchased.	None.	None.	4.224 cents.	
112. Cost of water per 1,000 gallons.	do.	15.55 cents.	None.	
113. Cost per cubic yard per hour at work.	\$0.1903.	1,000 feet pontoon pipe, at \$3.20.	Do.	
114. Linear feet of pipe line built during year and cost per linear foot.	2,110 feet.	1,000 feet land pipe, at \$1.975.	3.79 feet.	
115. Linear feet of embankment built during year and cost per linear foot.	None.	2,110 feet.	4,339.180.	
116. Area in square feet cut over by dredge during year.	2,223,000 square feet.	None, maintenance of channel.		
117. Average increase of depth of channel cut over.	5.6 feet.			
<i>Remarks.</i>				
1 No tug regularly attached to this dredge; intermittent tug service rendered.	Total time in commission: Jan. 1 to 21, and Oct. 1 to Dec. 31, 1916.			
2 2,451.5+ tons, at \$4.66.	Fuel used is bituminous coal, purchased in carload lots of about 50 short tons.			
3 161+ tons, at \$4.54.	1 248 tons, at \$4.91.			
4 None.	2 4 tons, at \$4.22.			
5 Gasoline.	3 4 men.			
6 Tug and launch hire.				
7 Operated in fresh water which was used in boilers.				
<i>Remarks.</i>				
1 11,479 cubic yards Cumberland Dividings; 76,743 cubic yards Jersey Creek; 32,580 cubic yards Three Mile Cut; 98,961 cubic yards Skidaway Narrows; 292,071 cubic yards Creighton Narrows; 7,960 cubic yards Sapelo Dividings—492,794 cubic yards dredged on Inside Waterway, Savannah to Fernandina, Fla.; 12,758 cubic yards Plantation Creek; 11,807 cubic yards Fort Screven; 65,544 cubic yards Sapelo Harbor; 25,041 cubic yards St. Marys River; total, 608,004 cubic yards.				
2 151.8 tons, at \$3.78.				
3 Fuel for engine.				
The above localities necessitated moving dredge over a distance of 300 miles. Coal purchased by long ton.				

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Crookers.	Currtuck.	Delatour.	Delcarrile.
1. District.....	Wilmington, N. C.....	Norfolk, Va.....	New Orleans, La.....	Washington, D. C.
2. When built.....	1911.....	1914.....	1908-9.....	1911-12.....
3. Where built.....	Camden, N. J.....	Baltimore, Md.....	Jeffersonville, Ind.....	Washington, D. C.
4. Builder.....	Not known.....	Ellicott Machine Corporation.....	M. A. Sweeney Shipyard & Foundry Co.....	(c).
5. Time to build.....	do.....	94 months.....	18 months.....	11 months.....
6. Material of hull.....	Wood.....	Steel.....	Wood.....	Georgia pine.
7. Contract cost of dredge.....	\$22,000.....	\$164,180.....	\$34,566.86.....	(1).
8. (a) Cost of outfit; (b) cost of pipe line.....	do.....	(a) \$4,020.41; (b) \$25,388.....	(a) \$1,000; (b) \$975.....	(e) 1; (b) 1
9. Length.....	80 feet.....	150 feet.....	112 feet.....	80 feet.....
10. Beam.....	31 feet 6 inches.....	37 feet.....	30 feet.....	26 feet.....
11. Depth.....	8 feet.....	11 feet 10 inches.....	5 feet.....	7 feet.....
12. Draft.....	(a) Forward.....	6 feet.....	4 feet.....	4 feet 3 inches.
(b) Aft.....	4 feet 11 inches.....	6 feet.....	4 feet 2 inches.....	3 feet 4 inches.
13. Displacement (long tons).....	235.....	805.....	390.....	273.3.
14. Number of crew.....	24.....	48.....	18 single crew, 28 double crew.....	15.
15. Number, size and type of propelling engines.....	None.....	None.....	Two 12 by 48 inch, lever puppet valve Co, Cutoff Hor.	None.
16. Number, size, and type of pumping engines.....	1 fore-and-aft compound condensing 104 by 184 by 10 inch stroke.....	1 vertical triple expansion; 14, 224, and 40 inches by 20-inch stroke.....	1 compound condensing Morris vertical, 12 by 14 inch.....	One 10 and 30 by 10 inch compound condensing direct connected.....
17. Cutter engines:				
(a) Diameter of cylinders.....	84 inches.....	11 inches.....	8 inches.....	8 inches.
(b) Stroke.....	10 inches.....	14 inches.....	10 inches.....	8 inches.
18. Hauling engines:				
(a) Diameter of cylinders.....	7 inches.....	84 inches.....	12 inches.....	6 inches.
(b) Stroke.....	10 inches.....	12 inches.....	48 inches.....	10 inches.
19. Bollers:				
(a) Number and type.....	2 Almy water-tube.....	4 Scotch marine.....	3 fine type.....	One 150-horsepower water tube Worthington.
(b) Length.....	91 inches.....	12 feet.....	30 feet.....	10 feet 9 inches.
(c) Diameter.....	131 inches wide, height 117 inches.....	9 feet 7 inches.....	One 43-inch and two 43-inch.....	7 feet 7 inches wide, 11 feet 4 inches high.
(d) Heating surface (total).....	1,005 square feet.....	4,682.6 square feet.....	1,405.45 square feet.....	1,340.72 square feet.
(e) Grate surface (total).....	54.7 square feet.....	1.60 square feet.....	48 square feet.....	40.1 square feet.
20. Discharge pipe in use (average number of feet).....	700.....	510.....	3,300.....	550.
21. Diameter of discharge pipe.....	15, inches.....	20 inches.....	13 and 16-inches.....	12 inches.
22. (a) Number and material of those in use (average).....	6, iron; 24, wood.....	12, catamarans; wood.....	10, wood.....	25, Georgia pine.
(b) Dimensions.....	2 cylinders, 3 feet diameter, 20 inches long; 9 by 18 by 3 feet 10 inches.....	25 feet 6 inches long; 5 feet 6 inches wide, 5 feet 2 inches deep.....	2 by 8 by 24 feet.....	16 by 6 feet, 2 inches by 2 feet.

23. Revolutions per minute of propelling engines.	None.	148.	None.	148.	None.
24. Revolutions per minute of pumping engines.	200 to 250, average 225.	Spiral.	200 to 250, average 225.	200.	Ellisotti spiral.
25. Type of agitator or cutter head.	.....	.....	.....	.....	.....
26. Diameter of cutter.	4 feet.	Ellisotti.	6 feet 7 inches.	4 feet.	Ellisotti spiral.
27. Diameter of cutter shaft.	5 inches.	.....	7 inches.	34 inches.	34 inches.
28. Type of suction head.	Oval.	.....	Oblong.	14 inch gas pipe.	Ellisotti solid with hood.
29. Revolutions per minute of cutter head.	7.	.....	9.	15.	12.
30. Average boiler pressure (gauge).	175 pounds.	.....	175 pounds.	130 pounds.	145 pounds.
31. Kind of coal used.	Run-of-mine bituminous.	.....	Run-of-mine.	Palmetto mine run and Alabama.	Bituminous.
32. Average gauge pressure in discharge pipe.	12 pounds.	.....	17 pounds per square inch.	22 pounds.	19 pounds.
33. Average vacuum in suction pipe.	15 inches.	.....	7 inches.	18 inches.	11 inches.
ATTENDANT PLANT.					
Tugboat.					
34. Name of tug attached to dredge.	St. Charles.	.....	Skyhook.	.....	None.
35. Number of crew.	2.	.....	3.	.....	.....
36. Displacement.	15 tons.	.....	41 long tons.	.....	.....
37. Draft.	1 foot.	.....	3 feet 7 inches.	None.	.....
(a) Forward.	4 feet 6 inches.	.....	5 feet 4 inches.	.....	.....
(b) Aft.	.....	.....	.....	.....	.....
Launches.					
38. Name.	Oliver; Leroy.	.....	Orlando.	.....	Colonel Leach.
39. Length.	24 feet; 27 feet 11 inches.	.....	41 feet.	.....	26.4 feet.
40. Beam.	8 feet; 9 feet.	.....	11 feet 6 inches.	.....	10.5 feet.
41. Depth.	28 inches; 1 foot 10 inches.	.....	6 feet.	.....	5 feet.
42. Draft.	28 inches; 2 feet 6 inches.	.....	4 feet.	.....	2 feet forward, 3.5 feet aft.
43. Displacement.	5 tons; 3 tons.	.....	15 long tons.	.....	8.3 tons.
Barges.					
44. Identifying numbers of barges in use.	1; 11.	.....	Nos. 10 and 11.	2.	1 No. 5.
45. Usage.	Water; coal.	.....	Coal and equipment.	.....	Coal.
46. Displacement, light (each).	9 tons; 50 tons.	.....	58 long tons.	.....	50 tons.
47. Capacity of barges (each).	20 tons; 175 tons.	.....	20 long tons.	.....	200 tons.
WORK PERFORMED.					
48. Location of dredging.	(?).	.....	Virginia cut, inland waterway, Norfolk, Va., to Beaufort, Va. let, N.C.	.....	(?), (?).
49. Average depth before dredging.	(?).	.....	5 feet.	.....	(?) 2.2 feet; (?) 4.5 feet.
50. Average depth after dredging.	(?).	.....	13 feet.	.....	(?) 12.9 feet; (?) 9.3 feet.
51. Character of material dredged.	80 per cent sand; 20 per cent mud.	.....	30 per cent sand; 40 per cent clay; 30 per cent mud.	.....	Mud, 91 per cent; sand, 9 per cent; conglomerate of clay, sand, and gravel, 4 per cent.

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Crotian.			Currituck.			Delaware.			Delaware.
	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	
WORK PERFORMED—continued.										
52. Rate of advance per hour (in feet straight ahead).....	17.....	2 13.....	.....	16.8.....	.....	.....	6.8.....	.....	.....	(*) 339,000 cubic yards; (*) 146,655 cubic yards; total, 485,655 cubic yards.
53. Amount dredged during the year.....	395,965.4 cubic yards.....	.....	.....	387,160 cubic yards.....	.....	.....	417,974.27 cubic yards.....	.....	.....	(*) 999,070 cubic yards; (*) 146,655 cubic yards.
54. Total amount dredged by this dredge at this locality.....	395,965.4 cubic yards.....	.....	.....	670,996 cubic yards.....	.....	.....	.....	.....	.....	223 cubic yards.
55. Average amount dredged: (a) Per hour (pumping).....	160.3 cubic yards.....	.....	.....	276 cubic yards.....	.....	.....	193.29 cubic yards.....	.....	.....	2,010 cubic yards.
(b) Per day (pumping).....	1,912.9 cubic yards.....	.....	.....	2,514 cubic yards.....	.....	.....	2,176.95 cubic yards.....	.....	.....	69,146 cubic yards.
56. Maximum amount dredged in one month.....	64,950.7 cubic yards.....	.....	.....	81,431 cubic yards.....	.....	.....	June, 69,400 cubic yards.....	.....	.....	242
57. Total number of days upon which any dredging was done.....	207.....	.....	.....	154.....	.....	.....	192.....	.....	.....	9
58. Average number of working hours per working day.....	14 hours 52 minutes.....	.....	.....	19.78.....	.....	.....	10 hours 35 minutes.....	.....	.....	11.45
59. Maximum number of working hours per working day.....	24.....	.....	.....	24.....	.....	.....	19 hours 20 minutes.....	.....	.....	.....
DISTRIBUTION OF TIME.										
60. Time of work:	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	
(a) Pumping.....	2,469	30	28.11	1,402	50	15.97	2,193	55	45.34	24.84
(b) Handling pipe line.....	392	40	4.54	1,139	50	1.59	244	30	5.05	1.57
(c) Handling swinging wires (cleaning suction).....	88	30	1.01	1,125	.....	12.81	66	20	1.37	1.68
(d) Going to and from wharf or anchorage.....	.....	.....	.....	347	5	3.96	1,300	10	6.20	.....
(e) Placing dredge.....	108	30	1.24	.....	.....	.....	30	10	.63	23
(f) Waiting for vessels to pass.....	10	55	.12	31	50	.36	45	35	.94	26
(g) Time lost from work:	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
(a) Changing location of plant.....	572	15	6.51	72	.....	.81	402	30	8.33	94
(b) Bad weather.....	146	30	1.67	69	55	45	45	55	1.44	55
(c) Washing boilers and ordinary repairs.....	696	30	7.93	38	.....	.43	161	35	3.33	93
(d) Extraordinary repairs.....	395	.....	4.50	3,696	45	40.95	243	.....	5.08	44
(e) Other causes.....	2,469	10	28.11	530	40	6.04	209	50	4.34	4,647
(f) Sundays and holidays.....	1,428	.....	16.26	1,500	.....	17.06	871	.....	18.00	1,833
Total hours in year.....	8,784	.....	100.00	8,784	.....	100.00	8,784	.....	100.00	8,784
Total time at work.....	8,077	5	88.00	8,046	35	92.55	7,880	40	89.55	82.91
Total time lost from work.....	6,706	55	65.00	6,737	35	77.45	1,907	40	40.47	15.18
Total time lost from work.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100.00
Total time lost from work.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	31.91
Total time lost from work.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	68.09

COST OF WORK.

Dredge.

65. Pay rolls.....	\$22,670.39
66. Fuel for boilers.....	\$7,132.16
67. Coal for galley.....	\$53.94
68. Water.....	\$31.26
69. Supplies, subsistence.....	3,862.89
70. Supplies, engine room.....	535.89
71. Other supplies.....	781.13
72. Renewals or additions to outfit.....	2,080.46
73. Ordinary repairs:	
(a) Hull.....	1,194.15
(b) Machinery (exclusive of main dredging pump).....	2,622.00
74. Laundry, fuel, miscellaneous expenses.....	
75. Total.....	\$43,638.09

Main dredging pump.

76. Diameter of runner.....	4 feet 10 inches.
77. Vanits (lined or unlined).....	Unlined.

.....	\$24,810.75	.....	83 inches.
.....	\$5,460.85	.....	Lined.
.....	\$64.80	.....	.....
.....	6,797.90	.....	.....
.....	2,711.76	.....	.....
.....	\$8,827.81	.....	.....
.....	683.68	.....	.....
.....	339.50	.....	.....
.....	374.41	.....	.....
.....	597.87	.....	.....
.....	\$54,302.06	.....	.....
.....	\$24,086.29	.....	.....

60 inches.
Unlined.

.....	\$39,834.20
.....	\$3,013.51
.....	\$21.68
.....	2,940.72
.....	394.48
.....	120.03
.....	797.00
.....	44.27
.....	197.85
.....	\$63.08
.....	\$17,678.75

TABLE V.—*Performances of pipe-lins hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.*

Name.....	Crescent.			Currituck.			Delaware.			Delaware.		
	Number purchased.	Number pumping.	Total cost.	Number purchased.	Number pumping.	Total cost.	Number purchased.	Number pumping.	Total cost.	Number purchased.	Number pumping.	Total cost.
COST OF WORK—continued.												
<i>Main dredging pump—Continued.</i>												
78. Renewals:												
(a) Vehicle.....												
(b) Runner.....												
(c) Volute liners.....												
(d) Runner liners.....												
(e) Head and back liners.....	2	899	\$91.00									
79. Miscellaneous repairs.....			2.10									
80. Total.....			\$92.10			\$1,028.02			\$986.00		71	\$901.49
												18,280.34
<i>Pipe line.</i>												
81. Renewals:												
(a) Rubber sleeves.....	20		419.50									
(b) Pipe.....	770		1,650.46									
(c) Pentecosts.....	15		2,548.68									
(d) Outfit.....			190.30									
82. Repairs.....			138.00									
83. Miscellaneous.....												
84. Total.....			4,946.43						1,298.50			783.44
												19,068.68
<i>Towboats and launches.</i>												
85. Pay roll.....			\$1,549.26			\$4,374.43						19,8313.97
86. Fuel for boilers.....			192,218.04			\$9,151.26			4817.58			
87. Coal for galley.....						\$19 12.00			\$ 16.25			
88. Water.....												(11)
89. Supplies, subsistence.....			411.73			\$33.63						
90. Supplies, engine room.....			131.43			\$201.66						
91. Launch supplies.....						\$1,260.61						\$91.16
92. Other supplies.....			58.44			\$ 189.87						29.04

FLOATING PLANT.

4055

93. Renewals of or additions to outfit.....	6.78						181.69
94. Ordinary repairs.....	182.41						176.81
95. Laundry, ice, miscellaneous expenses, etc. Total.....	517.99						.....
		\$5,104.02				\$333.83	\$1,553.00
96. Barges (amounts chargeable to dredge).							20,652.28
97. Ordinary repairs to barges.....	34.00						.....
98. Miscellaneous expenses.....							.....
99. Total field cost.....		\$43,802.30					\$20,652.28
100. Total field cost per cubic yard (cents).....	0.135		16.60			\$27,089.99	4.246
<i>Extra expenses.</i>							
101. Office expenses, superintendence, surveys, etc. Total.....	4,410.64		2,400.00			837.80	1,080.00
102. Extraordinary repairs to dredge: (a) Hull.....	1,582.15		3,810.25			1,400.00	None.
(b) Machinery (exclusive of main dredging pump).....	1,166.09		7,631.70				Do.
103. Extraordinary repairs to towboats and launches.....			980.24			32.40	Do.
104. Extraordinary repairs to barges.....							Do.
105. Total.....		60,980.18		79,443.85		29,530.19	1,080.00
106. Gross cost per cubic yard (cents).....	15.4		20.52				21,682.28
<i>MISCELLANEOUS.</i>							
107. Number of pounds of fuel per yard of material.....	9.1		18.2				An average of 3.5 pounds.
108. Fuel consumed by dredge, tons or barrels.....	1,617.1 long tons.		3,146.04 long tons.....				1,023 long tons.
109. Fuel consumed by auxiliary plant, tons or barrels.....	193.84 barrels		56.25 long tons.....				None.
110. Cost of fuel.....	\$9,405.56		\$2,690 per long ton.....				\$3,635.19.
111. Water purchased.....	62,500		None.....				None.
112. Cost of water per 1,000 gallons.....	50 cents		None.....				Do.
113. Cost per cubic yard per hour at work.....	13.5 cents		7.12 cents.....				About 2 cents.
114. Linear feet of pipe line built during year and cost per linear foot.....	500 feet shore pipe, \$1.70; 270 feet pontoon pipe, \$2.30.		None.....				None.
115. Linear feet of embankment built dur- ing year and cost per linear foot.....			26,880 linear feet, at 25.3 cents per linear foot.				2,600 linear feet, at 27.1 cents, \$705.55.

TABLE V.—Performance of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name	Credm.	Curttuck.	Delatour.	Dalecarlie.
MISCELLANEOUS—CONTINUED.				
116. Area in square feet cut over by dredge during year.	3,073,000	845,520	2,088,620	1,978,770
117. Average increase of depth of channel cut over.	2.69 feet.	5 feet.	5 feet 3 inches	6.8 feet.
Remarks.	Remarks.	Remarks.	Remarks.	Remarks.
Includes cost of pipe line and outfit.	Includes 1,074 hours and 54 minutes consumed in removing obstructions from pump.	The cost of labor done by crew on pump is about \$500.	The cost of labor done by crew on pump is about \$500.	Hull was built in August, 1911, under contract with the Skinner Ship Building Co., at cost of \$1,200; machinery was transferred from old hull in Dalecarlia Reservoir and assembled on new hull by hired labor.
Location of dredging.	Average depth before dredging.	Average depth after dredging.	Average depth before dredging.	Average depth after dredging.
Neuse River, N. C.	Feet	Feet	Feet	Feet
Do.	3.5	7	190	190
Do.	10.5	12.3	From Plaquemine Lock to Covington.	From Plaquemine Lock to Covington.
Harbor at Morehead City, N. C.	9	11.3	From Covington to Wards Creek.	From Covington to Wards Creek.
Waterway Core Sound-Beaufort Harbor	10	11	From Wards Creek to Slidell.	From Slidell to Covington.
Harbor at Beaufort, N. C.	5	11	From Slidell to Covington.	From Covington to Burrwood.
Shallowbag and Tar Rivers.	5.4	6	From Burrwood to Calcasieu Lake.	From Calcasieu Lake to Plaquemine Lock.
Panlico and Tar Rivers.	5.5	6	From Plaquemine Lock to Bayou Grossetete.	From Plaquemine Lock to Bayou Grossetete.
Waterway, Pamlico Sound-Beaufort Inlet.	9	11	From Bayou Grossetete to Bayou Grossetete.	From Bayou Grossetete to Bayou Grossetete.
1,008.1 long tons, at \$4.45.				
12 tons, at \$4.45.				
62,800 gallons, at 80 cents per 1,000 gallons.				
Feet.				
No record.				
19,384 barrels, at 11.44+.				
Fuel purchased by the barrel: weight of 1 gallon, 8.6 pounds.				

tons of gasoline, at 22.6 cents per gallon. Fuel was purchased by the short ton.	11	to Bayou Plaquemine.	11	* 1,017 long tons, at \$3.43 to \$3.76. * 6 long tons, at \$3.43 to \$3.76. * Repairs. * 1 man, at \$35 to \$70. * 11 Substances furnished on dredge, cost included in No. 49.
		Total.....	1,397	
		* Snagging.		
		* 13,225 barrels, at 36 cents +.		
		* 180 barrels, at 36 cents +.		
		* 1,068 gallons gasoline at .0175 cents.		
		* 45 gallons cylinder oil, at 25 cents.		

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Delta.	Epilton.	Etna.	Flad, Henry.
1. District.....	St. Louis, Mo., Mississippi River Commission.	St. Louis, Mo., Mississippi River Commission.	Rock Island, Ill.	St. Louis, Mo., Mississippi River Commission.
2. When built.....	1897.....	1898.....	1908-9.....	1901.....
3. Where built.....	Clifton Terrace, Ill.	Grafton, Ill.	Des Moines Rapids Canal, United States.	Grafton, Ill.
4. Builder.....	New York Dredging Co.	Springfield Boiler & Manufacturing Co.		Buoyron Steam Shovel & Dredge Co.
5. Time to build.....	13 months.....	15 months.....	About 9 months.....	About 26 months.....
6. Material of hull.....	Steel.....	Steel.....	Wood, steel frames.....	Steel.....
7. Contract cost of dredge.....	\$191,940.....	\$102,000.....	\$250,074.21.....	\$122,400.....
8. (a) Cost of outfit. (b) Cost of pipe line.....			(a) Included in above.....	(b) \$12,300.....
9. Length.....	185 feet 6 inches.....	182 feet.....	130 feet.....	192 feet.....
10. Beam.....	38 feet.....	40 feet.....	28 feet.....	44 feet.....
11. Depth.....	8 feet 4 inches.....	7 feet 6 inches.....	5 feet.....	7 feet.....
12. Draft.....				
(a) Forward.....	4 feet 10 inches.....	3 feet 8 inches.....	2 feet 6 inches.....	3 feet 10½ inches.....
(b) Aft.....	4 feet 10 inches.....	4 feet 8 inches.....	2 feet 7½ inches.....	5 feet.....
12. Displacement (long tons).....	820.....	600.....	250.....	824.....
14. Number of crew.....	4.....	40.....	19 men.....	42.....
15. Number, size, and type of propelling engines.....	None.....	None.....	No propelling engines.....	Two 22-inch cylinders, 7-foot stroke, Mississippi River, side wheel.
16. Number, size, and type of pumping engines.....	One 22 and 48 by 24 inch vertical pound condensing.....	Two 16 and 26 by 18 inch horizontal, tandem, compound.....	One 13 and 26 by 16 inch cross compound condensing.....	Two 15 and 30 by 24 inch horizontal, tandem, compound condensing.....
17. Cutter engines:				
(a) Diameter of cylinders.....	None.....	None.....	No cutter engines.....	None.....
(b) Stroke.....				
18. Hauling engines:				
(a) Diameter of cylinders.....	10 inches.....	8½ inches.....	8½ inches.....	7 inches.....
(b) Stroke.....	12 inches.....	8 inches.....	10 inches.....	Do.....
19. Boilers:				
(a) Number and type.....	4 Home water tube.....	6 Mississippi River, cylindrical, flue.....	3 Benson.....	7 Mississippi River, cylindrical, flue.....
(b) Length.....	19 feet 6 inches.....	28 feet 5½ inches.....	18 feet.....	20 feet.....
(c) Diameter.....	20 feet 9 inches.....	48 inches.....	60 inches.....	60 inches.....
(d) Heating surfaces (total).....	8,784 square feet.....	3,908 square feet.....	2,000 square feet.....	3,048 square feet.....
(e) Grate surface (total).....	142 square feet.....	134 square feet.....	60 square feet.....	157.5 square feet.....
20. Discharge pipe in use (average number of feet).....				
21. Diameter of discharge pipe.....	24 inches.....	32 inches.....	19 inches.....	32 inches.....

22. Pistons: (a) Number and material of those in use (average).....	.....	15 composite.....	.....
23. Dimensions.....	.....	50 by 14 feet by 3 feet 4 inches.....	.....
24. Revolutions per minute of propelling engines.....	.....	No propelling engines.....	.....
25. Revolutions per minute of pumping engines.....	.....	225.....	.....
26. Type of agitator or cutter head.....	Water-jet agitator.....	No cutter head.....	Water-jet agitator.....
27. Diameter of cutter.....	.....	.....	.....
28. Diameter of cutter shaft.....	Up and downstream, with water jet.....	Plain square.....	Upstream, w h water jet.....
29. Type of cutter head.....	.....	.....	.....
30. Revolutions per minute of cutter head.....	.....	90 pounds.....	.....
31. Average boiler pressure (gauge).....	.....	Bituminous.....	.....
32. Kind of coal used.....	.....	8 pounds.....	.....
33. Average gauge pressure in discharge pipe.....	.....	18 inches.....	.....
34. Average vacuum in suction pipe.....	.....	.....	.....
APPENDANT PLANT.			
Towboat.			
35. Name of tug attached to dredge.....	.....	None regularly.....	None.....
36. Number of crew.....	.....	.....	.....
37. Displacement.....	.....	.....	.....
38. Draft: (a) Forward..... (b) Aft.....	.....	.....	.....
Launches.			
39. Name.....	.....	None.....	.....
40. Length.....	.....	.....	.....
41. Beam.....	.....	.....	.....
42. Depth.....	.....	.....	.....
43. Draft.....	.....	.....	.....
44. Displacement.....	.....	.....	.....
Barges.			
45. Identifying numbers of barges in use.....	.....	No. 356 and No. 408.....	.....
46. Usage.....	.....	Fuel (coal) flats.....	.....
47. Displacement, light (each).....	.....	50 long tons each.....	.....
48. Capacity of barges (each).....	.....	133 long tons each.....	.....
WORK PERFORMED.			
49. Location of dredging.....	See Remarks.....	Mississippi River (Memphis Harbor).....	Mississippi River, Wisconsin River to LeChare.....
50. Average depth before dredging.....	.....	.....	3.54 feet.....
51. Average depth after dredging.....	.....	.....	.....
52. Name of contractor.....	.....	.....	.....
53. Name of engineer.....	.....	.....	.....
54. Name of pilot.....	.....	.....	.....
55. Name of tug.....	.....	.....	.....
56. Name of barge.....	.....	.....	.....
57. Name of launch.....	.....	.....	.....
58. Name of engine.....	.....	.....	.....
59. Name of pump.....	.....	.....	.....
60. Name of agitator.....	.....	.....	.....
61. Name of cutter.....	.....	.....	.....
62. Name of shaft.....	.....	.....	.....
63. Name of pipe.....	.....	.....	.....
64. Name of discharge pipe.....	.....	.....	.....
65. Name of suction pipe.....	.....	.....	.....
66. Name of valve.....	.....	.....	.....
67. Name of gate.....	.....	.....	.....
68. Name of dam.....	.....	.....	.....
69. Name of lock.....	.....	.....	.....
70. Name of canal.....	.....	.....	.....
71. Name of river.....	.....	.....	.....
72. Name of lake.....	.....	.....	.....
73. Name of bay.....	.....	.....	.....
74. Name of strait.....	.....	.....	.....
75. Name of sound.....	.....	.....	.....
76. Name of inlet.....	.....	.....	.....
77. Name of outlet.....	.....	.....	.....
78. Name of point.....	.....	.....	.....
79. Name of head.....	.....	.....	.....
80. Name of tail.....	.....	.....	.....
81. Name of dam.....	.....	.....	.....
82. Name of lock.....	.....	.....	.....
83. Name of canal.....	.....	.....	.....
84. Name of river.....	.....	.....	.....
85. Name of lake.....	.....	.....	.....
86. Name of bay.....	.....	.....	.....
87. Name of strait.....	.....	.....	.....
88. Name of sound.....	.....	.....	.....
89. Name of inlet.....	.....	.....	.....
90. Name of outlet.....	.....	.....	.....
91. Name of point.....	.....	.....	.....
92. Name of head.....	.....	.....	.....
93. Name of tail.....	.....	.....	.....
94. Name of dam.....	.....	.....	.....
95. Name of lock.....	.....	.....	.....
96. Name of canal.....	.....	.....	.....
97. Name of river.....	.....	.....	.....
98. Name of lake.....	.....	.....	.....
99. Name of bay.....	.....	.....	.....
100. Name of strait.....	.....	.....	.....

TABLE V.—Performance of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916.

Name.....	Delta.			Eyedra.			Euse.			Fud, Henry.		
	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
WORK PERFORMED—continued.												
50. Average depth after dredging.....												
51. Character of material dredged.....												
52. Rate of advance per hour (in feet straight ahead).....												
53. Amount dredged during the year.....												
54. Total amount dredged by this dredge at this locality.....												
55. Average amount dredged:												
(a) Per hour (pumping).....												
(b) Per day.....												
56. Maximum amount dredged in one month.....												
57. Total number of days upon which any dredging was done.....												
58. Average number of working hours per working day.....												
59. Maximum number of working hours per working day.....												
DISTRIBUTION OF TIME.												
60. Time at work:												
(a) Pumping.....												
(b) Handling pipe line.....												
(c) Handling swinging wires (cleaning suction).....												
(d) Going to and from wharf or anchorage.....												
(e) Placing dredge.....												
(f) Waiting for vessels to pass.....												
61. Time lost from work:												
(a) Changing location of plant.....												
(b) Bad weather.....												
(c) Washing boilers and ordinary repairs.....												
(d) Extraordinary repairs.....												
(e) Other causes.....												
(f) Sundays and holidays.....												
62. Total hours in year.....	8,784		100.00	8,784		100.00	8,784		100.00	8,784		100.00
63. Total time at work.....												
64. Total time lost from work.....	8,784		100.00	5,808	5	60.37	7,338	8	83.31	8,784		100.00

COST OF WORK.

Dredge.

64. Pay rolls.....	\$20,970.12
65. Fuel for boilers.....	14,827.23
66. Coal for galley.....	47.40
67. Water.....	5,940.41
68. Supplies, subsistence.....	313.23
69. Supplies, engine room.....	1,183.87
70. Other supplies.....	329.39
71. Renewals or additions to outfit.....	
72. Ordinary repairs:	
(a) Hull.....	2,123.26
(b) Machinery (exclusive of main dredging pump).....	7,392.46
73. Laundry, lee, miscellaneous expenses.....	23.43
74. Total.....	\$29.05

29.05

Main dredging pump.

76. Diameter of runner.....	84 inches.
77. Volute (lined or unlined).....	Unlined.

84 inches.
Unlined.

47,612.97

50 inches.
Front and back only lined.

12,401.06

84 inches.
Lined.

2,771.93

	Number pur- chased.	Number pumping hours used.	Total cost.
78. Renewals:			
(a) Volute.....			
(b) Runner.....			
(c) Volute liners.....			
(d) Runner liners.....			
(e) Head and back liners.....			
79. Miscellaneous repairs.....			
80. Total.....			\$890.13
81. Renewals:			
(a) Rubber sleeves.....			
(b) Pipe.....	10		\$406.80
(c) Pontoon.....			
(d) Outfit.....			
82. Repairs.....			
83. Miscellaneous.....			
84. Total.....			\$116.00

	Number pur- chased.	Number pumping hours used.	Total cost.
85. Diameter of runner.....			
86. Volute (lined or unlined).....			

	Number pur- chased.	Number pumping hours used.	Total cost.
87. Diameter of runner.....			
88. Volute (lined or unlined).....			

	Number pur- chased.	Number pumping hours used.	Total cost.
89. Diameter of runner.....			
90. Volute (lined or unlined).....			

	Number pur- chased.	Number pumping hours used.	Total cost.
91. Diameter of runner.....			
92. Volute (lined or unlined).....			

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Delta.	Expellm.	Errs.	Fuel, Heavy
<i>Towboats and launches.</i>				
85. Pay rolls.....	.....	.....	\$131.61	.....
86. Fuel for boilers.....	.....	.....	.....	.....
87. Coal for galley.....	.....	.....	.....	.....
88. Water.....	.....	.....	.....	.....
89. Supplies, subsistence.....	.....	.....	.....	.....
90. Supplies, engine room.....	.....	.....	.....	.....
91. Launch supplies.....	.....	.....	.....	.....
92. Other supplies.....	.....	.....	.....	.....
93. Renewals of or additions to outfit.....	.....	.....	.....	.....
94. Ordinary repairs.....	.....	.....	.....	.....
95. Laundry, ice, miscellaneous expenses, etc.....	.....	.....	.....	.....
96. Total.....	.....	.....	\$131.61	.....
<i>Barges (amounts chargeable to dredge).</i>				
97. Ordinary repairs to barges.....	.....	.....	.....	.....
98. Miscellaneous expenses.....	.....	.....	.....	.....
99. Total field cost.....	.....	.....	.....	.....
100. Total field cost per cubic yard (cents).....	11.44.....	\$45,612.10.....	13,923.49.....	.....
<i>Extra expenses.</i>				
101. Office expenses, superintendence, surveys, etc.....	.....	.....	.....	.....
102. Extraordinary repairs to dredge:				
(a) Hull.....	.....	.....	.....	.....
(b) Machinery (exclusive of main dredging pump).....	.....	.....	.....	.....
103. Extraordinary repairs to towboats and launches.....	.....	.....	.....	.....
104. Extraordinary repairs to barges.....	.....	.....	.....	.....
105. Total.....	.....	.....	.....	.....
106. Gross cost per cubic yard (cents).....	12.45.....	\$3,940.33.....	15,391.33.....	.....
		4.53.....	.....	\$6,985.33

4063

107. Number of pounds of fuel per yard of material.
108. Fuel consumed by dredges, tons or barrels.
109. Fuel consumed by auxiliary plant, tons or barrels.
110. Cost of fuel.
111. Water purchased.
112. Cost of water per 1,000 gallons.
113. Cost per cubic yard per hour at work.
114. Linear feet of pipe line built during year and cost per linear foot.
115. Linear feet of embankment built during year and cost per linear foot.
116. Area in square feet cut over by dredge during year.
117. Average increase of depth of channel cut over.

34.4.....
.....
3,188 tons.....
.....
314,887.23.....
.....
9.14 cents.....
.....
.....
.....
23 feet (in o
box).

7.15.	1,004.	8.04 t	\$1.81-	None	.....d	1,171,	7.08 f
			None	.....		
			None	.....		

Remarks.
No dredging done
dredge during year.

Remarks.
Fuel purchased by

Remarks.

Dredge Etna was in commission 127 days, all of which were spent dredging in the channel and placing sand on range for the base of spur dams in the Mississippi River, vicinity of Bellevue, Iowa, and Savanna, Ill.

¹ Includes pontoons

² Winter repairs to dredge, winter 1915-16.

Remarks.
No dredging by this dredge during year.

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Florida.	Fort Chartres.	Fort Cage.	Gamma.
1. District.....	Jacksonville, Fla.	St. Louis, Mo.	St. Louis, Mo.	St. Louis, Mo., Mississippi River Commission.
2. When built.....	1904-5.	1907-8.	1907-8.	1907.
3. Where built.....	Jacksonville, Fla.	Dubuque Iowa.	Dubuque Iowa.	Jeffersonville, Ind.
4. Builder.....	Merrill-Stevens Co.	Dubuque Boat & Boiler Works.	Dubuque Boat & Boiler Works.	Bucyrus Steam Shovel & Dredge Co.
5. Time to build.....	8 months.	19 months.	16 months.	About 1 year.
6. Material of hull.....	Steel.	Steel.	Steel.	Steel.
7. Contract cost of dredge.....	\$80 000.	\$176 795.54.	\$177 973.08.	\$85,530.60.
8. (a) Cost of outfit; (b) Cost of pipe line.....	(a) \$10,000; (b) not known.	(a) Unknown.	(a) Unknown.	165 feet 6 inches.
9. Length.....	152 feet over all, except overhang at wheel.	197 feet.	197 feet.	38 feet.
10. Beam.....	20 feet 9 inches.	45 feet.	45 feet.	7 feet 10 inches.
11. Depth.....	7 feet.	7 feet 6 inches.	7 feet 6 inches.	4 feet.
12. Draft.....	4 feet 8 inches.	4 feet.	4 feet.	4 feet 2 inches.
13. Displacement (long tons).....	271.	815.	815.	531.
14. Number of crew.....	49.	49.	49.	36.
15. Number, size, and type of propelling engines.....	Two 15½ inches by 5 feet 6 inches Horizontal Marshall valve and rock.	Two 24 inches by 8 feet, Mississippi River.	Two 24 inches by 8 feet, Mississippi River.	Two; high pressure, 15 inches; low pressure, 30 inches; 20-inch stroke.
16. Number, size, and type of pumping engines.....	One 12 and 20 by 12 Westing-house compound.	Two 16½ inches and 30 by 24 inches tandem compound condensing.	Two 16½ inches and 30 by 24 inches tandem compound condensing.	One 18 and 32½ by 22 inches horizontal cross compound, condensing.
17. Cutter engines:	None.	None.	None.	None.
(a) Diameter of cylinders.....	do.	do.	do.	do.
(b) Stroke.....	do.	do.	do.	do.
18. Hauling engines:	15 inches.	7 inches.	7 inches.	7 inches.
(a) Diameter of cylinders.....	do.	do.	do.	do.
(b) Stroke.....	do.	do.	do.	do.
19. Bolsters:	3 Clyde dry dock.	6 Mississippi River.	6 Mississippi River.	6 Mississippi River, cylindrical.
(a) Number and type.....	11 feet 3 inches.	30 feet.	30 feet.	28 feet.
(b) Length.....	8 feet.	4 inches, three 10-inch and two 11-inch flues.	4 inches, three 10-inch and two 11-inch flues.	48 inches.
(c) Diameter.....	2,174 square feet.	3,926 square feet.	3,926 square feet.	3,998 square feet.
(d) Floating surface (total).....	24 square feet.	131 square feet.	131 square feet.	120 square feet.
20. Discharge pipe in use (average number of feet).....	216.	440 feet.	440 feet.	450 feet.
21. Diameter of discharge pipe.....	12 inches.	32 inches.	32 inches.	24 inches.

[illegible]

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Florida.				Fort Charles.				Fort Gage.				Gamma.			
	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Gamma.
WORK PERFORMED—continued.																
51. Character of material dredged.....																
52. Rate of advance per hour (in feet straight ahead).....																
53. Amount dredged during the year.....																
54. Total amount dredged by this dredge at this locality.....																
55. Average amount dredged: (a) Per hour (pumping).....	671		7.938	483		5.50	415		4.5	210		4.5				
(b) Per day.....	65		.745	73		.08	27		.3							
56. Maximum amount dredged in one day.....	18		.204			.06			.4	12		.14				
57. Total number of days upon which any dredging was done.....																
58. Average number of working hours per working day.....																
59. Maximum number of working hours per working day.....																
DISTRIBUTION OF TIME.																
60. Time at work: (a) Pumping.....	7		.070	130		1.43	52		.6	67		.77				
(b) Handling pipe line.....	13		.147	5		.06	13		.1							
(c) Handling swinging wires (cleaning suction).....	177		2.015	262		2.89	82		.8	228		2.80				
(d) Going to and from wharf or anchorage.....	106		1.217	282		3.10	148		1.6	433		4.99				
(e) Placing dredge.....																
(f) Waiting for vessels to pass.....																
(g) Changing location of plant.....																
(h) Bad weather.....																
(i) Washing boilers and ordinary repairs.....	488		5.555													
(j) Extraordinary repairs.....	5,799		66.017	7,137		82.19	7,750		89.0	7,826		89.08				
(k) Other causes.....	1,440		16.364	312		3.43	240		2.6							
(l) Sundays and holidays.....																
Total hours in year.....	8,794		100.000	8,794		100.00	8,794		100.0	8,784		100.00				
Total time at work.....	8,774		8.810	741			840			280		2.80				
Total time lost from work.....	8,010		91.19	8,050			8,280			8,493		98.70				

Dredge.

64.	Pay roll.....	
65.	Fuel for boilers.....	
66.	Coal for galley.....	
67.	Water.....	
68.	Supplies, subsistence.....	
69.	Supplies, engine room.....	
70.	Supplies, engine room.....	
71.	Other supplies.....	
72.	Reconnaiss or additions to outfit.....	
73.	Ordinary repairs:	
	(a) Fuel.....	
	(b) Machinery (exclusive of main dredging pump).....	
74.	Laundry, too, miscellaneous expenses.....	
75.	Total.....	

Meta dredging pump.

76. Diameter of runner.	28 inches			
77. Volts (lined or unlined)	Lined			
	Number purchased.	Number per hour used.	Total cost.	
78. Renewals:				
(a) Volute.....	14		\$115.00	
(b) Runner.....				
(c) Volute liners.....				
(d) Runner liners.....				
(e) Head and back liners.....	2		125.00	
79. Miscellaneous repairs.....				
80. Total.....				\$240.00
81. Renewals:				
(a) Rubber sleeves.....				
(b) Pipe, feet.....				
(c) Pontoon.....				
(d) Outfit.....				
82. Repairs.....				
83. Miscellaneous.....				100.21
84. Total.....				190.21

Number purchased.	Number in bearing.	Total cost.
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
15	15	15
16	16	16
17	17	17
18	18	18
19	19	19
20	20	20
21	21	21
22	22	22
23	23	23
24	24	24
25	25	25
26	26	26
27	27	27
28	28	28
29	29	29
30	30	30
31	31	31
32	32	32
33	33	33
34	34	34
35	35	35
36	36	36
37	37	37
38	38	38
39	39	39
40	40	40
41	41	41
42	42	42
43	43	43
44	44	44
45	45	45
46	46	46
47	47	47
48	48	48
49	49	49
50	50	50
51	51	51
52	52	52
53	53	53
54	54	54
55	55	55
56	56	56
57	57	57
58	58	58
59	59	59
60	60	60
61	61	61
62	62	62
63	63	63
64	64	64
65	65	65
66	66	66
67	67	67
68	68	68
69	69	69
70	70	70
71	71	71
72	72	72
73	73	73
74	74	74
75	75	75
76	76	76
77	77	77
78	78	78
79	79	79
80	80	80
81	81	81
82	82	82
83	83	83
84	84	84
85	85	85
86	86	86
87	87	87
88	88	88
89	89	89
90	90	90
91	91	91
92	92	92
93	93	93
94	94	94
95	95	95
96	96	96
97	97	97
98	98	98
99	99	99
100	100	100

Number purchased.	Number being pumped.	Total cost.
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
15	15	15
16	16	16
17	17	17
18	18	18
19	19	19
20	20	20
21	21	21
22	22	22
23	23	23
24	24	24
25	25	25
26	26	26
27	27	27
28	28	28
29	29	29
30	30	30
31	31	31
32	32	32
33	33	33
34	34	34
35	35	35
36	36	36
37	37	37
38	38	38
39	39	39
40	40	40
41	41	41
42	42	42
43	43	43
44	44	44
45	45	45
46	46	46
47	47	47
48	48	48
49	49	49
50	50	50
51	51	51
52	52	52
53	53	53
54	54	54
55	55	55
56	56	56
57	57	57
58	58	58
59	59	59
60	60	60
61	61	61
62	62	62
63	63	63
64	64	64
65	65	65
66	66	66
67	67	67
68	68	68
69	69	69
70	70	70
71	71	71
72	72	72
73	73	73
74	74	74
75	75	75
76	76	76
77	77	77
78	78	78
79	79	79
80	80	80
81	81	81
82	82	82
83	83	83
84	84	84
85	85	85
86	86	86
87	87	87
88	88	88
89	89	89
90	90	90
91	91	91
92	92	92
93	93	93
94	94	94
95	95	95
96	96	96
97	97	97
98	98	98
99	99	99
100	100	100

82 inches. Lined.	Number pur- chased.	N u m b e r p u n n i n g hours used.	Total cost.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	\$162.71
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	17.48
.	.	.	- 17.48

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Florida.	Fort Chester.	Fort Gage.	Gamma.
<i>Towboats and launches.</i>				
95. Pay rolls.....	(1)	\$292.50	.....	.....
96. Fuel for boilers.....	\$217.40	\$300.94	.....	.....
97. Coal for galley.....	.....	.....	.....	.....
98. Water.....	.....	.....	.....	.....
99. Supplies, subsistence.....	.....	50.25	.....	.....
100. Supplies, engine room.....	8.40	17.00	.....	.....
101. Launch supplies.....	10.15	.....	.....	.....
102. Other supplies.....	.....	4.00	.....	.....
103. Renewals of or additions to outfit.....	.....	.....	.....	.....
104. Ordinary repairs.....	281.75	242.84	.....	.....
105. Laundry, for, miscellaneous expenses, etc.	50.00	3.98	.....	.....
96. Total.....	\$574.70	\$681.49	.....	.....
<i>Barges (amounts chargeable to dredge).</i>				
97. Ordinary repairs to barges.....	63.66	.....	.....	.....
98. Miscellaneous expenses.....	.....	.....	.....	.....
99. Total field cost.....	16,524.93	25,281.14	\$27,073.91	\$16,750.41
100. Total field cost per cubic yard (cents).....	27.1	3.88	9.11	14.79
<i>Extra expenses.</i>				
101. Office expenses, superintendence, surveys, etc.	874.05	260.00	\$250.00	\$3,794.09
102. Extraordinary repairs to dredge:				
(a) Hull.....	2,992.90	.....	.....	.....
(b) Machinery (exclusive of main dredging pump).....	4,505.95	.....	2,304.34	.....
103. Extraordinary repairs to towboats and launches.....	211.35	.....	.....	.....
104. Extraordinary repairs to barges.....	.....	.....	.....	.....
105. Total.....	94,076.53	26,511.14	29,628.26	20,880.44
106. Gross cost per cubic yard (cents).....	40.5	3.92	9.9	18.13

MISCELLANEOUS.

107. Number of pounds of fuel per yard of material.	313 tons coal; 100 cords wood.
108. Fuel consumed by dredge, tons or barrels.	1,087 gallons gasoline.
109. Fuel consumed by auxiliary plant, tons or barrels.	181.4
110. Cost of fuel.	\$2.10 ton.
111. Water purchased.	\$3.
112. Cost of water per 1,000 gallons.	12.76 cents.
113. Cost per cubic yard per hour at work.	
114. Linear feet of pipe line built during year and cost per linear foot.	
115. Linear feet of embankment built during year and cost per linear foot.	
116. Area in square feet cut over by dredge during year.	639,660 square feet.
117. Average increase of depth of channel cut over.	(*)

Remarks.

This dredge was laid up, out of commission, from Mar. 9 until Nov. 1, 1916.
 1 Includes salary of launch man and salary of watchman while dredge was laid up.
 * 233 tons coal, at \$4.42; 85 tons, at \$5; and 100 cords of wood at \$5 per cord.
 * 8 tons, at \$5.
 * 12,000 gallons, at \$3.
 * 1,087 gallons, at 20 cents.
 * St. Johns River, 4.7 feet; Indian Waterway, 2.8 feet; Indian River, 2 feet.

Remarks.

Mississippi River between mouths of Ohio and Missouri Rivers:
 Locality.
 Perry Towhead..... 32,230
 Ste. Genevieve Bend..... 69,900
 Bee Bluff..... 93,100
 Hamburg Towhead..... 87,900
 Brewer Point..... 41,900
 Cliff Cave..... 47,600
 Ames Towhead..... 41,200
 Gibsony Island..... 41,200
 Head of Bee Bluff..... 25,900
 Hurricane Field..... 43,500
 Sliding Island..... 14,200
 Grand Tower..... 42,300
 Fort Cage..... 29,800
 Cliff Cave..... 650,500

19,517.73 tons, at \$2.10.
 * 30 tons.
 * 1 m.v.
 * 181.4 tons, at \$2.10.

Remarks.

Mississippi River between mouths of Ohio and Missouri Rivers:
 Locality.
 Perry Towhead..... 62,000
 Seventy-six..... 51,000
 Grand Tower..... 31,400
 Bishop..... 44,900
 Hines..... 31,800
 Sliding Island..... 22,400
 Perry Towhead..... 6,000
 Grand Tower Island..... 10,100
 Sliding Island..... 7,400
 Graysboro Harbor..... 297,300

Graded bank for revetment at Turkey Island, 6,800 cubic yards.

Remarks.

Dredging at following places:
 Yankee Bar (176) before dredging, 11 feet; after, 12.5 feet.
 Foot Island 28 (184) before dredging, 9 feet; after, 12 feet.
 Dredging in Memphis Harbor in January.
 Dredging sand and mud from Marine Ways at Dredge Fleet.
 Fuel purchased by short tons.

FLOATING PLANT.

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Geyer.	Gillespie, Gen. G. L.	Goodale & Co.
1. District.....	Rock Island, Ill.	First New York	Galveston, Tex.
2. When built.....	Hull rebuilt 1912.	1915.	1908.
3. Where built.....	Milan, Ill.	Baltimore, Md.	Victoria, Tex.
4. Builder.....	United States	Ellicott Machine Corporation, Baltimore, Md.	U. S. E. D.
5. Time to build.....	About 3 months.	About 10 months.	4 months.
6. Material of hull.....	Steel frames and deck, in bottom and sides.	Steel.	Wood.
7. Contract cost of dredge.....	\$23,491.06 (no contract).	1,817.00.	\$38,077.50.
8. (a) Cost of outfit; (b) cost of pipe line.	(a) Included in above; 100 feet.	(a) \$2,615; (b) \$15,703.50.	
9. Length.....	24 feet.	150 feet.	118 feet.
10. Beam.....	10 feet.	37 feet.	29 feet 3 inches.
11. Depth.....	4 feet 5 inches.	11 feet 10 inches.	5 feet 11 inches.
12. Draft.....	2 feet 11 inches.	7 feet 5 inches.	5 feet.
13. Displacement (long tons).....	2 feet 11 inches.	7 feet 6 inches.	5 feet.
14. Number of crew.....	145.	830.	38.
15. Number, size, and type of propelling engines.....	19 men.	43.	Two 12 by 48 inch, Western River.
16. Number, size, and type of pumping engines.....	No propelling engines.	None.	One 14 and 22 by 12 inch vertical compound.
17. Cutter engines:	One 12 and 22 by 12 inch cross compound, condensing.	One 14 by 22½ by 40 inch triple expansion, 20-inch stroke.	
(a) Diameter of cylinders.	No cutter engines.	11 inches.	7 inches.
(b) Stroke.		14 inches.	7 inches.
18. Hauling engines:		8½ inches.	10 inches.
(a) Diameter of cylinders.	4 inches.	12 inches.	12 inches.
(b) Stroke.	6 inches.		
19. Boilers:			
(a) Number and type.	2 Mississippi River type.	4 Scotch marine.	Two Scotch marine.
(b) Length.	18 feet.	12 feet.	10 feet.
(c) Diameter.	35 inches.	10 feet.	7 feet 6 inches.
(d) Heating surface (total).	554 square feet.	4,685.6 square feet.	734 square feet.
(e) Grate surface (total).	24.5 square feet.	300 square feet.	Oil burner; no grates.
20. Discharge pipe in use (average number of feet).	553 feet.	2,000 feet.	200 feet.
21. Diameter of discharge pipe.....	15 inches.	20 inches.	12 inches.
22. Pontoons:			
(a) Number and material of those in use (average).	12; wood.	50 wood, 11 steel.	8; wood.
(b) Dimensions.....	One 49 by 16 by 2 feet; eleven 44 by 17 by 2 feet.	Wood, 16 by 8 by 3½ feet; steel, 2 cylinders, diameter 4 feet, length 20 feet.	24 by 8 by 3 feet.
23. Revolutions per minute of propelling engines.	No propelling engines.	None.	12.

24. Revolutions per minute of pumping engine.....	226.	176.....	226.	Open rotary. 8 feet 10 inches.
25. Type of agitator or cutter head.....	No cutter head.	Elliott spiral-blade cage cutter.	Open.	18.
26. Diameter of cutter.....	7 inches.	9 feet 7 inches.	150 pounds.	Crude oil.
27. Diameter of cutter shaft.....	7 inches.	14.	9 pounds.	11 inches.
28. Type of suction head.....	Plain square.	14.		
29. Revolution per minute of cutter head.....	150 pounds.	10 pounds.		
30. Average boiler pressure (gauge).....	Bituminous lump.	30 pounds.		
31. Kind of coal used.....	11 pounds per square inch.	10 inches.		
32. Average gauge pressure in discharge pipe.....	25 inches of mercury.			
33. Average vacuum in suction pipe.....				
ATTENDANT PLANT.				
Teeboet.				
34. Name of tug attached to dredge.....	None regularly.	Col. Thayer.	Col. Thayer.	
35. Number of crew.....	3.	34 tons.		
36. Displacement.....	5 feet.	6 feet 5 inches.		
37. Draft.....	(5) Forward. (6) Aft.....			
Lawacha.				
38. Name.....	None.	Niagara (hired).	Live Garp (hired)	
39. Length.....	38 feet.	45 feet.	10 feet 6 inches.	
40. Beam.....	8 feet.	5 feet.	6 feet.	
41. Depth.....	3 feet 6 inches.	4 feet 4 inches.		
42. Draft.....				
43. Displacement.....				
Barya.				
44. Identifying numbers of barges in use.....	No. 493 and No. 494.	No. 11 and No. 26.		
45. Usage.....	Fuel (coal) flats.	Coal.		
46. Displacement, light (each).....	40 long tons each.	85 tons; 80 tons.		
47. Capacity of barges (each).....	90 long tons each.	200 long tons each.		
WORK PERFORMED.				
48. Location of dredging.....	Mississippi River, St. Paul to Winona and Milan, section I, and Mississippi Canal.	Hudson River, N. Y.	Woodbridge Shoal Harbor, N. J.	Intraoceanal canal.
49. Average depth before dredging.....	6.75 feet.	-9.1 L. L. W.	5 feet to 8 feet.	3 feet.
50. Average depth after dredging.....	11.30 feet.	-14.3 L. L. W.	8 feet to 10 feet.	7 feet.

3. Oil, water, and storage.

Victoria.
Cavallo.
Eclipse.
30 feet 10 inches.
8 feet 10 inches.
5 feet 9 inches.
3 feet 4 inches.
12 tons.
24 feet.
9 feet.
5 feet 2 inches.
3 feet 3 inches.
11 tons.

No. 11 and No. 26.
Coal.
85 tons; 80 tons.
200 long tons each.

Mississippi River, St. Paul to Winona and Milan, section I, and Mississippi Canal.
6.75 feet.
11.30 feet.

Woodbridge Shoal Harbor, N. J.
5 feet to 8 feet.
8 feet to 10 feet.

Intraoceanal canal.
3 feet.
7 feet.

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Capeer.				Gilliepie, Gen. G. L.				Guadalupe.			
	Hours.	Minutes.	Percentage.		Hours.	Minutes.	Percentage.		Hours.	Minutes.	Percentage.	
WORK PERFORMED—Continued.												
51. Character of material dredged.....												
52. Rate of advance per hour (in feet straight ahead).....												
53. Amount dredged during the year.....												
54. Total amount dredged by this dredge at this locality.....												
55. Average amount dredged:												
(a) Per hour (pumping).....												
(b) Per day.....												
56. Maximum amount dredged in 1 month.....												
57. Total number of days upon which any dredging was done.....												
58. Average number of working hours per working day.....												
59. Maximum number of working hours per working day.....												
DISTRIBUTION OF TIME.												
60. Time at work:												
(a) Pumping.....	1,362	8	14.83		2,873		47.32		3,050	20	34.72	
(b) Handling pipe line.....	31	53	.61		621		10.23		176	10	1.89	
(c) Handling swinging wires (cleaning suction).....	53	17	.36		353	35	5.83		212	55	2.43	
(d) Going to and from wharf or anchorage.....	27	40	.31						32	30	.37	
(e) Placing dredge.....	78	12	.89		96	20	1.58		1	10	.01	
(f) Waiting for vessels to pass.....	26	10	.30									
61. Time lost from work:												
(a) Changing location of plant.....	330	7	3.76		354	30	5.84		144	50	1.65	
(b) Bad weather.....	4	15	.05						457	35	5.22	
(c) Washing boilers and ordinary repairs.....	21		.24						332	10	3.70	
(d) Extraordinary repairs.....	61	18	.70		404	25	6.66		23	30	.26	
(e) Other causes.....	6,148		69.98		597	10	9.84		2,894	50	32.69	
(f) Sundays and holidays.....	700		7.97		773		12.70		1,498		16.94	
62. Total hours in year.....	8,784		100.00		8,784		100.00		8,784		100.00	
63. Total time at work.....	1,519	20	17.30		3,943	55	64.96		3,473	5		
64. Total time lost from work.....	7,264	40	82.70		2,128	5	35.04		5,310	55		

FLOATING PLANT.

4073.

COST OF WORK.

Dredge.

	86,817.04	821,995.49	5763.19	519,353.41
65. Pay rolls.....	86,817.04	821,995.49	5763.19	519,353.41
66. Fuel for boilers.....	986.49	9,167.31	2,007.11	8,140.68
67. Coal for galley.....	.....	.....	34.26	34.26
68. Water.....	.....	48.28	.....	48.28
69. Supplies, subsistence.....	.....	7,284.00	94.86	7,189.14
70. Supplies, engine room.....	1,433.99	.....	831.14	5,920.38
71. Other supplies.....	317.99	2,634.48	1.54	1,721.34
72. Renewals or additions to outfit.....	153.77	6,475.78	.....	43.28
73. Ordinary repairs:.....	476.39	1,486.26	375.60	3,846.09
(a) Hull.....	.....	16.30	.....	1,172.14
(b) Machinery (exclusive of main dredging pump).....	9.31	2,617.74	72.00	2,263.28
74. Laundry, ice, miscellaneous expenses.....	39.39	116.00	19.79	.....
Total.....	86,753.37	859,382.34	85,005.11	843,572.67

	82 inches	8 feet
76. Diameter of runner.....	82 inches	8 feet
77. Volume (lined or unlined).....	Heads only, lined	Unlined

Mains dredging pump.

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Gageet.				Gilliarpe, Gen. G. L.				Gundaluppe.			
	Number pur- chased.	Number pumping hours used.	Total cost.		Number pur- chased.	Number pumping hours used.	Total cost.		Number pur- chased.	Number pumping hours used.	Total cost.	
COST OF WORK—continued.												
<i>Main dredging pump—Continued.</i>												
78. Renewals:												
(a) Valve.....												
(b) Runner.....												
(c) Valve liners.....												
(d) Runner liners.....	4		\$324.00									
(e) Head and back liners.....			119.00									
79. Miscellaneous repairs.....			\$0.38									
80. Total.....			\$0.38				\$643.24					
<i>Pipe line.</i>												
81. Renewals:												
(a) Rubber sleeves.....							1,608.01				\$818.27	
(b) Pipe.....							181.35				440.90	
(c) Pontoon.....							66.21					
(d) Outfit.....							134.81					
82. Repair.....							108.66					
83. Miscellaneous.....												
84. Total.....							2,198.01				\$49.08	\$1,266.17
<i>Towboats and launch.</i>												
85. Pay rolls.....							\$1,081.16				\$580.00	
86. Fuel for boilers.....							\$ 706.10				105.80	
87. Coal for galley.....												
88. Water.....												
89. Supplies, subsistence.....											\$38.26	
90. Supplies, engine room.....			\$10.45				40.28				220.68	
91. Launch supplies.....			2.81								\$82.43	
92. Other supplies.....							\$ 804.74				186.75	

FLOATING PLANT.

4075

93. Renewals of or additions to outfit.....	.....	161.83	.....	.....	.....	112.85
94. Ordinary repairs.....	.....	60.00	.....	.....	.....	24.47
95. Laundry, ice, miscellaneous expenses, etc.	.....	1,941.85	.....	.....	.....	887.77
96. Total.....	12.26	.....	5,447.95	702.90	.....	2,267.45
<i>Barges (amounts chargeable to dredge).</i>						
97. Ordinary repairs to barges.....	.....	.....	.....	6.80	.....	.....
98. Miscellaneous expenses.....	.....	.....	.....	.....	.....	115.00
99. Total field cost.....	9,776.01	.....	67,599.54	5,894.54	.....	47,140.29
100. Total field cost per cubic yard (cents).....	\$0.0528	.....	\$0.0480	\$0.3630	\$0.04033	.....
<i>Extra expenses.</i>						
101. Office expenses, superintendence, surveys, etc.	\$462.36	.....	.....	.....	.....	\$2,644.71
102. Extraordinary repairs to dredge:	.....	.....	.....	.....	.....	.....
(a) Hull.....	\$524.07	.....	.....	.....	.....	.....
(b) Machinery (exclusive of main dredging pump).....	.....	.....	.....	.....	.....	.....
103. Extraordinary repairs to towboats and launches.....	.....	.....	.....	.....	.....	.....
104. Extraordinary repairs to barges.....	.....	.....	.....	.....	.....	.....
105. Total.....	968.43	.....	8,264.81	.....	.....	2,644.71
106. Gross cost per cubic yard (cents).....	10,764.44	.....	75,964.35	.....	.....	49,788.00
106. Gross cost per cubic yard (cents).....	\$0.582	.....	\$0.0539	.....	\$0.04604	.....
<i>MISCELLANEOUS.</i>						
107. Number of pounds of fuel per yard of material.....	7.16 pounds.	.....	6.45 pounds.	.....	.....	1.88 pounds.
108. Fuel consumed by dredge, tons or barrels.....	591.08 tons.	.....	4,070 tons.	.....	.....	9,267 barrels.
109. Fuel consumed by auxiliary plant, tons or barrels.....	11.8 tons.	.....	.....	.....	.....	.....
110. Cost of fuel.....	\$3.786 per ton (approximately).	.....	.....	.....	.....	.....
111. Water purchased.....	None.	.....	.....	.....	.....	.....
112. Cost of water per 1,000 gallons.....	None.	.....	.....	.....	.....	.....
113. Cost per cubic yard per hour at work.....	None.	.....	.....	.....	.....	.....
114. Linear feet of pipe line built during year and cost per linear foot.....	None.	.....	.....	.....	.....	.....
115. Linear feet of embankment built during year and cost per linear foot.....	None.	.....	.....	.....	.....	.....

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Geyser.	Gallierle, Gen. G. L.	Grudeloys.
MISCELLANEOUS—continued.			
116. Area in square feet cut over by dredge during year.....	900,880 square feet.....	7,800,000 square feet.....	7,236,179 square feet.
117. Average increase of depth of channel cut over.....	5.05 feet.....	5.2 feet.....	Intracoastal canal, 4 feet.
	<p><i>Remarks.</i></p> <p>Dredge Geyser was in commission 144 days, 24 days of which were spent on the Milan section, Illinois and Mississippi Canal; 42 days at LeClaire cofferdam, and 78 days dredging in channel and placing sand on range for base of spur dams in the Mississippi River, vicinity of Fountain City, W. Va., and Wisconsin.</p> <p>Includes pontoons.</p> <p>Winter repairs to dredge, winter 1915-16.</p>	<p><i>Remarks.</i></p> <p>Data supplied is all that is available.</p> <p>This dredge was purchased Feb. 20, 1916, and loaned for work in third New York district, in Woodbridge Creek, N. J., and Shoal Harbor, N. J., until Mar. 25; laid up in New York Harbor, Mar. 26 to Apr. 14, awaiting conditions to permit her transfer for work on upper Hudson River.</p>	<p><i>Remarks.</i></p> <p>16,267 barrels, at \$1.35. 26 tons, at \$13. 9,000 gallons, at 12 cents per thousand. Includes Fort Point charges of \$715.78.</p>

Name.	Gulfport.	Hampton.	Harrod, B. M.	Hedge.
1. District.....	Mobile, Ala.....	Norfolk, Va.....	St. Louis, Mo., Mississippi River Commission.	Root Island, Ill.
2. When built.....	1913.....	1902.....	1907.....	1900-1901.
3. Where built.....	Baltimore, Md.....	Richmond, Va.....	Oraifton, Ill.....	Fountain City, W. Va.
4. Builder.....	Ellicott Machine Corporation.....	Not known.....	Springfield Boiler & Mfg. Co.....	United States.
5. Time to build.....	4 months to complete after approval of contract.	do.....	27 months.....	About 1 year.
6. Material of hull.....	Steel.....	Wood.....	Iron and steel.....	Wood.
7. Contract cost of dredge.....	\$108,446.....	\$4,800.....	\$238,998.17.....	\$27,084. (No contract).
8. (a) Cost of outfit; (b) Cost of pipe line.....	(a) \$6,967; (b) \$24,587.....	(a) Included with dredge; (b) \$750.....	.....	(a) Included in above; (b) \$4,262.16.
9. Length.....	150 feet.....	60 feet.....	210 feet.....	120 feet.
10. Beam.....	40 feet.....	23 feet.....	44 feet.....	26 feet.
11. Depth.....	11 feet 6 inches.....	6 feet.....	9 feet 6 inches.....	5 feet.
12. Draft.....	(a) Forward..... (b) Aft.....	3 feet 10 inches..... 2 feet 10 inches.....	6 feet 24 inch a..... 6 feet 6 inches.....	2 feet 7 inches. 1 foot 10 inches.
13. Displacement (long tons).....	866 tons.....	91.....	1,270.....	194.
14. Number of crew.....	42.....	10.....	47.....	18.
15. Number, size, and type of propelling engines.....	None.....	None.....	Two 20 by 40 by 30 inches cross compound condensing, geared to paddle wheels.	No propelling engines.
16. Number, size, and type of pumping engines.....	One, 14-inch, 22½-inch 40 by 20-inch, triple expansion.	1 vertical noncondensing, 12 inches by 12-inch stroke.	Two 20 by 34 by 24 inches horizontal tandem compound condensing.	One 14-inch and 24-inch by 15-inch cross compound condensing.
17. Cutter engines: (a) Diameter of cylinders..... (b) Stroke.....	11 inches..... 14 inches.....	None.....	None.....	No cutter engines.
18. Hauling engines: (a) Diameter of cylinders..... (b) Stroke.....	24 inches..... 12 inches.....	6 inches..... 9 inches.....	7 inches..... do.....	44 inches. 6 inches.
19. BOLLERS: (a) Number and type.....	4, Scotch marine.....	1 horizontal return tubular.....	9, Mississippi River, cylindrical, fine.	Two dry-back Scotch marine.
(b) Length.....	13 feet.....	134 feet.....	28 feet.....	15 feet 6 inches.
(c) Diameter.....	9 feet 7 inches.....	54 inches.....	47 inches.....	84 inches.
(d) Heating surface (total).....	4,685.6 square feet.....	1,042.8 square feet.....	5,634 square feet.....	1,636 square feet.
(e) Grate surface (total).....	150 square feet.....	20.96 square feet.....	210 square feet.....	49 square feet.
20. Discharge pipe in use (average number of feet).....	1,200 feet.....	300 feet.....	500.....	495 feet.
21. Diameter of discharge pipe.....	20 inches.....	12 inches.....	26 inches.....	15 inches.
22. Pontoons: (a) Number and material of those in use (average)..... (b) Dimensions.....	58; steel..... 23 by 4 by 4 feet.....	10; wood..... One is 16 by 7 by 2 feet; 7 are 16 by 6 by 2 feet.	10; steel..... 28 feet diameter by 2 feet 3 inches side, 5 feet 3 inches center.	12; composite. 50 feet by 14 feet by 3 feet 4 inches.
23. Revolutions per minute of propelling engines.....	None.....	None.....	70.....	No propelling engines.

TABLE V.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.*

Name.....	Gulfpport.	Hampson.	Harrod, B. M.	Hecla.
24. Revolutions per minute of pumping engines.....	144.....	.....	135.....	195.....
25. Type of agitator or cutter head.....	Elliptical spiral.....	Jet.....	Water-jet agitator.....	No cutter head.
26. Diameter of cutter.....	6 feet 7 inches (over blades).....	None.....	.....	None.
27. Diameter of cutter shaft.....	7 inches (increased to 8½ inches at cutter).....	36.....	.....	Do.
28. Type of suction head.....	Elliptical.....	12-inch pipe, circular.....	Up and down stream.....	Plain, square.
29. Revolutions per minute of cutter head.....	11.....	.....	.....	No cutter head.
30. Average boiler pressure (gauge).....	17½ pounds.....	.....	134 pounds.....	140 pounds.
31. Kind of coal used.....	Bituminous.....	.....	Bituminous.....	Bituminous lump.
32. Average gauge pressure in discharge pipe.....	25 pounds.....	.....	11 pounds.....	13.9 pounds per square inch.
33. Average vacuum in suction pipe.....	12 inches.....	.....	16 inches.....	16 inches of mercury.
ATTENDANT FLANT.				
Tideboat.				
34. Name of tug attached to dredge.....	Tuscaloosa.....	None.....	None.....	None regularly.
35. Number of crew.....	9.....	.....	.....	.....
36. Displacement.....	213.....	.....	.....	.....
37. Draft.....	5 feet 6 inches.....	.....	.....	.....
(a) Forward.....	5 feet 6 inches.....	.....	.....	.....
(b) Aft.....	5 feet 6 inches.....	.....	.....	.....
Launches.				
38. Name.....	Rattig.....	None.....	.....	Do.
39. Length.....	40 feet 9 inches.....	.....	.....	.....
40. Beam.....	12 feet 3 inches.....	.....	.....	.....
41. Depth.....	5 feet.....	.....	.....	.....
42. Draft.....	4 feet.....	.....	.....	.....
43. Displacement.....	25 tons.....	.....	.....	.....
Barges.				
44. Identifying numbers of barges in use.....	L and P.....	None.....	.....	No. 349 and No. 457.
45. Usage.....	Coal and water.....	.....	.....	Fuel (coal) flats.
46. Displacement, light (each).....	104 tons and 36 tons.....	.....	.....	50 long tons each.
47. Capacity of barges (each).....	240 tons and 80 tons.....	.....	.....	130 long tons each.

WORK PERFORMED.

48. Location of dredging.....
49. Average depth before dredging.....
50. Average depth after dredging.....
51. Character of material dredged.....
52. Rate of advance per hour (in feet straight ahead).....
53. Amount dredged during the year.....
54. Total amount dredged by this dredge at this locality.....
55. Average amount dredged:
(a) Per hour (pumping).....
(b) Per day.....
56. Maximum amount dredged in one month.....
57. Total number of days upon which any dredging was done.....
58. Average number of working hours per working day.....
59. Maximum number of working hours per working day.....

DISTRIBUTION OF TIME.

60. Time at work:
(a) Pumping.....
(b) Handling pipe line.....
(c) Handling swinging wires (cleaning suction).....
(d) Going to and from wharf or anchorage.....
(e) Placing dredge.....
(f) Waiting for vessels to pass.....
61. Time lost from work:
(a) Changing location of plant.....
(b) Bad weather.....
(c) Washing boilers and ordinary repairs.....
(d) Extraordinary repairs.....
(e) Other causes.....
(f) Sundays and holidays.....
62. Total hours in year.....
63. Total time at work.....
64. Total time lost from work.....

Gulport Harbor, Miss. No work done in 1916.
15.1 feet.....
23.3 feet.....
Mud and sand.....
17.5 feet.....
1,815,597 cubic yards.....
1,935,146.5 cubic yards.....
1,420.2 cubic yards.....
24,216.5 cubic yards.....
864,168.5 cubic yards.....
73.....
19.6.....
24.....

Mississippi River below Cairo.
See remarks.
do.....
do.....
Blue mud, mud, sand and gravel.
248.....
835,301 cubic yards.....
2,085 cubic yards.....
24,103 cubic yards.....
36,786 cubic yards.....
50 days.....
12 hours, 26 minutes.....
16 hours.....

Milan section Illinois and Mississippi Canal and LeChaire Canal.
6.32 feet.....
6.32 feet.....
10.2 feet.....
Sand, 80 per cent; loose rock, 20 per cent.
11 feet.....
68,290 cubic yards.....
178.86 cubic yards.....
1,665 cubic yards.....
36,786 cubic yards.....
50 days.....
12 hours, 26 minutes.....
16 hours.....

Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
1,278	28	14.55	(1)	(1)	(1)	400	40	4.56
81	20	.98				86	25	.98
31	26	.36				32	10	.36
15	38	.18				11	20	.13
35	35	.01				40	50	.46
101	30	1.15				599	50	6.71
897	19	10.22				84	25	.96
4,937	50	54.21				72	25	.83
1,440	16.39					7,013	25	70.87
						288		3.28
8,784		100.00						
1,407	21	16.02				8,784		100.00
						735	55	8.36
7,376	39	83.98						
						8,048	5	91.64

No work done in 1916.

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Gulfport.	Hampton.	Harrod, B. M.	Heda.
COST OF WORK.				
<i>Dredge.</i>				
65. Pay rolls.....	\$5,645.22	\$75.00	\$11,008.87	\$4,146.76
66. Fuel for boilers.....	\$2,840.86		4,988.89	1,151.86
67. Coal for galley.....	125.32		20.08	3.79
68. Water.....	112.40			Nemo.
69. Supplies, subsistence.....	1,978.65		3,100.40	847.79
70. Supplies, engine room.....	288.76		370.90	263.16
71. Other supplies.....	187.10			12.03
72. Renewals or additions to outfit.....	1,275.87			19.75
73. Ordinary repairs:				
(a) Hull.....	560.57		124.20	
(b) Machinery (exclusive of main dredging pump).....	288.07		994.41	
74. Laundry, ice, miscellaneous expenses.....	78.16		12.88	30.77
75. Total.....	\$16,120.98	\$75.00	\$21,216.98	\$6,476.91
<i>Main dredging pump.</i>				
76. Diameter of runner.....	96 inches.			98 inches.
77. Volume (lined or unlined).....	Unlined.			Lined front and back only.
	Number purchased.....	Number purchased.....	Number purchased.....	Number purchased.....
	Number pumping hours used.....	Number pumping hours used.....	Number pumping hours used.....	Number pumping hours used.....
	Total cost.....	Total cost.....	Total cost.....	Total cost.....
78. Renewals:				
(a) Valve.....				
(b) Runner.....				
(c) Volume liners.....				
(d) Runner link.....				
(e) Head and back liners.....				
79. Miscellaneous repairs.....			\$9.36	\$32.36
80. Total.....			\$9.36	\$32.36

TABLE V.—Performance of pipe-line hydraulic dredge for the calendar year ending Dec. 31, 1916—Continued.

Name.	Gulfport.	Hampton.	Harrod, B. M.	Heda.																	
MISCELLANEOUS.																					
107. Number of pounds of fuel per yard of material.	1.48.		5.5.	8.9.																	
108. Fuel consumed by dredge, tons or barrels.	1,212.5 long tons.		2,003.5 long tons.	394.1 long tons.																	
109. Fuel consumed by auxiliary plant, tons or barrels.	285 long tons.			5 long tons.																	
110. Cost of fuel.	\$3,538.77.		\$5,005.42.	\$2.77 per long ton (approximately).																	
111. Water purchased.	120,000 gallons.			None.																	
112. Cost of water per 1,000 gallons.	12 cents.			None.																	
113. Cost per cubic yard per hour at work.	\$0.0104.		\$0.77.	None.																	
114. Linear feet of pipe line built during year and cost per linear foot.	1,940 feet discharge pipe at \$4.55 per foot.			None.																	
115. Linear feet of embankment built during year and cost per linear foot.	5,509.84.		3,910,000.	684,310.																	
116. Area in square feet cut over by dredge during year.	8.2 feet.		2.5 feet.	3.87 feet.																	
117. Average increase of depth of channel cut over.																					
	Remarks. 1 Place measurement within theoretical section. * Total amount removed by dredge. * Of the 70 sleeves purchased, 5 were worn out by storm after a total of 2,054.5 hours, an average of 410.9 hours per sleeve, 17 were worn out after a total of 6,994.1 hours, an average of 411.4 hours, 31 sleeves have been used a total of 32,148 hours and are still in service, and 17 were transferred to dredge Pascagoula. * 12 men, at \$110 to \$35. * 315 tons, at \$2.11. * 16,700 gallons, at 12 cents per 1,000.	Remarks. No work done by this dredge in 1916. The expenditures given were for care of plant.	Remarks. Dredging at following places: <table><tr><th rowspan="2">Locality.</th><th colspan="2">Miles below Cairo.</th></tr><tr><th>Before.</th><th>After.</th></tr><tr><td>Foot Toney's Chute</td><td>78</td><td>12.5</td></tr><tr><td>Point Pleasant</td><td>80</td><td>10 13</td></tr><tr><td>Darnells</td><td>82</td><td>11 12.5</td></tr><tr><td>Gayosa</td><td>104</td><td>10 13</td></tr></table> Average depth.	Locality.	Miles below Cairo.		Before.	After.	Foot Toney's Chute	78	12.5	Point Pleasant	80	10 13	Darnells	82	11 12.5	Gayosa	104	10 13	Remarks. In commission 79 days dredging channel in at the lower approach to the Milan section, Illinois and Mississippi canal and dredging sand for the Le Claire Canal dam.
Locality.	Miles below Cairo.																				
	Before.	After.																			
Foot Toney's Chute	78	12.5																			
Point Pleasant	80	10 13																			
Darnells	82	11 12.5																			
Gayosa	104	10 13																			

All coal was purchased by the
 short ton and is so expressed
 above.
 The dredge was out of com-
 mission for a period of 84 months
 on account of lack of funds and
 damage due to hurricane of
 July 8, 1916.

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916.

Name	Houston, Tex.	Humphreys, (has.	Indiana.	Iola.
1. District	Galveston, Tex.	Mobile, Ala.	First, Cincinnati, Ohio.	St. Louis, Mo., Mississippi River Commission.
2. When built	1915.	1907-8.	1908.	1900.
3. Where built	Galveston, Tex.	Mobile, Ala.	Hull, Jeffersonville, Ind.; machinery, Baltimore, Md.	Graton, Ill.
4. Builder	Bowers Southern Dredging Co.	United States	Hull, Howard Ship Yards; Elliott Machine Works.	Springfield Boiler & Manufacturing Co.
5. Time to build	1 year.	About 1 year.	24 years.	About 2 years.
6. Material of hull	Wood.	Wood.	Steel.	Steel.
7. Contract cost of dredge	\$159,972.50.	\$46,500.97.	\$63,354.50 1.	\$100,479.79.
8. (a) Cost of outfit; (b) Cost of pipe line		(a) Included in contract cost.	(a) \$4,117.13; (b) \$14,827.52.	
9. Length	145 feet.	129 feet 9 inches.	125 feet.	192 feet.
10. Beam	38 feet.	32 feet.	34 feet.	44 feet.
11. Draft	12 feet.	8 feet 9 inches.	6 feet 10 inches.	7 feet.
12. Displacement (long tons)	7 feet 1 inch.	3 feet.	3 feet 8 inches.	3 feet 9 inches.
13. Displacement (long tons)	6 feet 3 inches.	2 feet 6 inches.	do.	4 feet 9 inches.
14. Number of crew	981.	224.	417.5.	800.
15. Number, size, and type of propelling engines.	57.	20 men; double crew, 8 hours each.	Has none.	47.
16. Number, size, and type of pumping engines.	None.	None.		Two, 22-inch cylinder, 6-foot stroke, Mississippi River, side wheel.
17. Cutter engines:	One 14 inches and 224 inches and 40 inches by 20 inches vertical, triple expansion.	1 vertical marine compound engine, 150 horsepower, direct connected to pump.	12 inches by 22 inches by 14 inches horizontal compound, develops 250 horsepower.	Two, 16 and 24 by 20 inches, horizontal tandem, compound condensing.
(a) Diameter of cylinders.		9 inches.	7 inches.	None.
(b) Stroke.	12 inches.	do.	10 inches.	
18. Hauling engines:	14 inches.			
(a) Diameter of cylinders.	10 inches.	8 inches.	11 inches.	7 inches.
(b) Stroke.	12 inches.	12 inches.	14 inches.	10.
19. Bollars:				
(a) Number and type.	2, Babcock-Wilcox water-tube.	2, Western Steamboat type, 6 flues, 11 inches.	1, Worthington water-tube marine, 270 horsepower.	7, Mississippi River (cylinder, flue).
(b) Length.	13 feet 6 inches.	26 feet.	13 feet 1 inch, with tubes 11 feet 31 inches long.	30 feet.
(c) Diameter.	8 feet 8 inches.	47 inches.		44 inches.
(d) Hauling surface (total).	4,380 square feet.	1,264 square feet.	2,432 square feet.	3,585 square feet.
(e) Grate surface (total).	None, oil burner.	41.6 square feet.	54.83 square feet.	157.8 square feet.
20. Discharge pipe in use (average number of feet).	None.	367.	800.	500.
21. Diameter of discharge pipe.	20 inches.	12 inches.	17 inches outside diameter.	32½ inches.

23. Pontoon: (a) Number and material of those in use (average).....	6 pairs, steel.....	23; wood.....	5; steel.....	10; steel.....
(b) Dimensions.....	46 inches diameter, 25 feet long.....	Length, 10 feet; beam, 6 feet; depth, 2 feet.....	40 feet long, 12 feet beam, 3 feet 2 inches depth.....	20 by 19 feet, top; 19 by 16.2 feet, bottom; 4 feet 6 inches, depth.....
23. Revolutions per minute of propelling engines.....	None.....	None.....	Has none.....	16.....
24. Revolutions per minute of pumping engines.....	180.....	238.....	256.....	156.....
25. Type of agitator or cutter head.....	Open rotary.....	Hemispherical rotary.....	Steel, spiral.....	Water-jet agitator.....
26. Diameter of cutter.....	6 feet 6 inches.....	6 feet 5 inches.....	5 feet.....	5 feet.....
27. Diameter of cutter shaft.....	8 inches.....	7.5 inches.....	5 inches.....	5 inches.....
28. Type of suction head.....	Open.....	Open flange opening inside cutter head.....	Elliptical opening 13 by 19 inches.....	Upstream, with water jet.....
29. Revolutions per minute of cutter head.....	12 to 14.....	8.....	15 to 20.....	118 pounds.....
30. Average boiler pressure (gauge).....	20 pounds.....	125 pounds per square inch.....	175 pounds.....	Bituminous, maine run.....
31. Kind of coal used.....	Crude oil.....	Bituminous, run of mine, washed nut.....	Bituminous, run of mine.....	
32. Average gauge pressure in discharge pipe.....	17 pounds.....	14 pounds.....	10 to 20 pounds.....	
33. Average vacuum in suction pipe.....	14 inches.....	9.7 inches.....	18 to 24 inches.....	

ATTENDANT PLANT.

Towboat.

34. Name of tug attached to dredge.....	None.....	(3).....	None.....
35. Number of crew.....	do.....		
36. Displacement.....	do.....		
37. Draft: (a) Forward.....	do.....	20 inches.....	
(b) Aft.....	do.....	do.....	

Launcher.

38. Name.....	Helen.....	Hartford.....	Lavaca.....	None.....	Nell.....
39. Length.....	Ft. in. 56 0	Ft. in. 60 4	Ft. in. 26 0	do.....	28 feet.....
40. Beam.....	12 4	16 6	7 4	do.....	5.5 feet.....
41. Depth.....	5 9	5 3	3 3	do.....	2 feet 2.5 inches.....
42. Draft.....	5 9	5 9	2 7	do.....	2 feet.....
43. Displacement.....	Tons. 38	Tons. 42	Tons. 4	do.....	1.5 tons.....

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Houston, Sam.	Humphreys, Chas.	Indiana.	Iowa.
ATTENDANT PLANT—continued.				
Barges.				
44. Identifying numbers of barges in use.....	1. No. 8.		Nos. 5, 6-8, 7.	
45. Usage.....	Oil and water.		5-6, storage; 6-7, fuel.	
46. Displacement, light (each).....	260.		63 tons.	
47. Capacity of barges (each).....			200.	
WORK PERFORMED.				
48. Location of dredging.....	Houston Ship Channel.	Black Warrior River	Ohio River, between Cincinnati, Ohio, and Paducah, Ky.	Mississippi River below Cairo.
	Texas City Channel and Dike.			
49. Average depth before dredging.....	20 feet.		6.41 feet.	(See remarks.)
50. Average depth after dredging.....	28 feet.		11.73 feet.	(See remarks.)
51. Character of material dredged.....	Shell, 40 per cent; mud, 60 per cent.	Sand and gravel	Sand, gravel, and mud.	(See remarks.)
52. Rate of advance per hour (in feet straight ahead).....	31 feet.	11.8.	20,983+	Sand, gravel, and mud.
53. Amount dredged during the year.....	3,687,838 cubic yards	161,160.	358,567.	138.
54. Total amount dredged by this dredge at this locality.....	3,149,406 cubic yards.	161,160.	(?).	212,577 cubic yards.
55. Average amount dredged: (a) Per hour (pumping).....	860 cubic yards.	82.6.	Sand, 609.88+; gravel, 246,475+.	883 cubic yards.
(b) Per day.....	15,600 cubic yards.	1,343.	Sand, 5,019.632+; gravel, 2,129,638+.	10,184 cubic yards.
56. Maximum amount dredged in one month.....	650,734 cubic yards.	37,160 cubic yards	133,562 cubic yards.....	146,523 cubic yards.
57. Total number of days upon which any dredging was done.....	238 days.	120.	98.	21.
58. Average number of working hours per working day.....	15 hours 13 minutes.	24, 3 shifts of 8 hours each.	9.07.	18 hours 15 minutes.
59. Maximum number of working hours per working day.....	21 hours 30 minutes.	24.	12.50.	24.

DISTRIBUTION OF TIME.																										
	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.																				
60. Time at work:																										
(a) Pumping.....	3, 733	45	42.50	1, 951		22.21																				
(b) Handling pig line.....	558	35	6.71	16		.13																				
(c) Handling wiring wires (cleaning suction).	360	20	4.11	8		.09																				
(d) Going to and from wharf or anchorage.....				2		.02																				
(e) Placing dredge.....				10		.11																				
(f) Waiting for vessels to pass.....				63		.72																				
61. Time lost from work:																										
(a) ("hauling location of plant.....	265	10	2.83	395		4.50																				
(b) Bad weather.....	288	30	3.29	72		.82																				
(c) Washing boilers and ordinary repairs.....	698	20	7.84	55		.63																				
(d) Extraordinary repairs.....	360		4.11	128		1.46																				
(e) Other causes.....	981		10.83	4, 644		52.87																				
(f) Sundays and holidays.....	1, 488		17.05	1, 440		16.39																				
62. Total hours in year.....	8, 784		100.00	8, 784		100.00																				
63. Total time at work.....	4, 683		53.40	2, 080		23.67																				
64. Total time lost from work.....	4, 101		46.60	6, 734		77.33																				
COST OF WORK.																										
<i>Dredge.</i>																										
65. Pay rolls.....	\$23, 331.99			\$3, 152.19																						
66. Fuel for boilers.....	26, 728.10			2, 947.27																						
67. Coal for galley.....	1, 452.00			16.13																						
68. Water.....	186.76			2.13																						
69. Supplies, subsistence.....	8, 784.64			1, 785.81																						
70. Supplies, engine room.....	2, 301.71			269.99																						
71. Other supplies.....	886.88			981.69																						
72. Renewals or additions to outfit.....	7, 852.11			174.25																						
73. Ordinary repairs:																										
(a) Hull.....	719.49			612.86																						
(b) Machinery (exclusive of main dredging pump).....	1, 954.02			2, 499.63																						
74. Laundry, lee, miscellaneous expenses.....	8, 126.53			92.02																						
75. Total.....	\$89, 264.23			\$17, 076.84																						
<i>Main dredging pump.</i>																										
76. Diameter of runner.....	96 inches			56 inches		76 inches																				
77. Volume (lined or unlined).....	Unlined.			Lined.		Unlined.																				
<table><tr><td>\$15, 109.76</td><td>\$119, 277.94</td></tr><tr><td>4, 767.06</td><td></td></tr><tr><td>2, 432.53</td><td></td></tr><tr><td>234.32</td><td></td></tr><tr><td>1, 220.63</td><td></td></tr><tr><td>1, 400.01</td><td></td></tr><tr><td>28.37</td><td></td></tr><tr><td>865.80</td><td></td></tr><tr><td>456.97</td><td></td></tr><tr><td>\$27, 591.35</td><td></td></tr></table>							\$15, 109.76	\$119, 277.94	4, 767.06		2, 432.53		234.32		1, 220.63		1, 400.01		28.37		865.80		456.97		\$27, 591.35	
\$15, 109.76	\$119, 277.94																									
4, 767.06																										
2, 432.53																										
234.32																										
1, 220.63																										
1, 400.01																										
28.37																										
865.80																										
456.97																										
\$27, 591.35																										

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Houston, Sam.	Humphreys, Chas.	Indiana.	Iola.
ATTENDANT PLANT—Continued.				
<i>Barges.</i>				
44. Identifying numbers of barges in use.....	1. No. 8.....	2.....	Non. 5, 6-4, 7.....	
45. Usage.....	Oil and water.....	Fuel barges.....	5-6, storage; 6-7, fuel.....	
46. Displacement, light (each).....	250.....	51.....	63 tons.....	
47. Capacity of barges (each).....	250.....	200.....	206.....	
WORK PERFORMED.				
48. Location of dredging.....	Houston Ship Channel. Texas City Channel and Dike.	Black Warrior River.....	Ohio River between Cincinnati, Ohio, and Paducah, Ky.....	Mississippi River below Cairo.
49. Average depth before dredging.....	20 feet.....	5.9.....	6.41 feet.....	(See remarks.)
50. Average depth after dredging.....	28 feet.....	7.9.....	11.73 feet.....	(See remarks.)
51. Character of material dredged.....	Shell, 40 per cent; mud, 60 per cent.....	Sand and gravel.....	Sand, gravel, and mud.....	(See remarks.)
52. Rate of advance per hour (in feet straight ahead).....	31 feet.....	11.8.....	20.963+.....	Sand, gravel, and mud.
53. Amount dredged during the year.....	3,687,838 cubic yards.....	161,160.....	348,597.....	128.
54. Total amount dredged by this dredge at this locality.....	3,149,406 cubic yards.....	161,160.....	(?).....	213,877 cubic yards.
55. Average amount dredged: (a) Per hour (pumping).....	860 cubic yards.....	82.6.....	Sand, 609.88+; gravel, 245.475+.....	888 cubic yards.
(b) Per day.....	15,500 cubic yards.....	1,343.....	Sand, 5,019.652+; gravel, 2,129-638+.....	10,184 cubic yards.
56. Maximum amount dredged in one month.....	659,734 cubic yards.....	37,160 cubic yards.....	133,592 cubic yards.....	146,623 cubic yards.
57. Total number of days upon which any dredging was done.....	238 days.....	120.....	98.....	21.
58. Average number of working hours per working day.....	15 hours 13 minutes.....	24, 3 shifts of 8 hours each.....	9.07.....	18 hours 16 minutes.
59. Maximum number of working hours per working day.....	21 hours 30 minutes.....	24.....	13.50.....	24.

DISTRIBUTION OF TIME.										
	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	
60. Time at work:										
(a) Pumping.....	3,733	45	42.50	1,951	833	22.21	9.45	242	15	2.76
(b) Handling pipe line.....	598	55	6.71	16	49	.18	.57	58	10	.61
(c) Handling winding wires (cleaning suction).....	360	20	4.11	8	90	.09	.91			
(d) Going to and from wharf or anchorage.....				2		.02				
(e) Placing dredge.....				10		.11	1.14	67	35	.77
(f) Waiting for vessels to pass.....				63		.72	.38	20	40	.24
61. Time lost from work:										
(a) Changing location of plant.....	285	10	2.83	395	428	4.50	4.88	74	25	.85
(b) Bad weather.....	288	30	3.20	72	229	.82	2.62			
(c) Washing boilers and ordinary repairs.....	698	20	7.84	55	118	.63	1.36	77	50	.89
(d) Extraordinary repairs.....	360		4.11	128	4	.14	.05			
(e) Other causes.....	981		10.83	4,644	6,153	52.87	70.05	5,245	5	.08
(f) Sundays and holidays.....	1,488		17.06	1,440	753	16.39	8.56			
62. Total hours in year.....	8,784		100.00	8,784	8,784	100.00	100.00	8,784		100.00
63. Total time at work.....	4,683		53.40	2,050	1,097		12.49	353	40	4.37
64. Total time lost from work.....	4,101		46.60	6,734	7,687		87.51	8,430	20	95.63
COST OF WORK.										
<i>Dredge.</i>										
65. Pay rolls.....	\$32,331.99		\$8,152.19				\$15,109.78		\$9,192.41	
66. Fuel for boilers.....	25,728.10		2,847.37				4,767.05		3,535.13	
67. Coal for galley.....	4,452.00		21.13						19.98	
68. Water.....	169.76		1,785.81						2,943.30	
69. Supplies, subsistence.....	8,789.64		309.99				3,432.52		2,843.80	
70. Supplies, engine room.....	2,301.71		809.99				324.32		294.71	
71. Other supplies.....	836.88		851.69				1,220.63		287.05	
72. Renewals or additions to outfit.....	7,852.11		174.25				1,400.01			
73. Ordinary repairs:										
(a) Hull.....	719.49		612.86				23.37		1,176.96	
(b) Machinery (exclusive of main dredging pump).....	1,956.02		2,499.63				965.80		1,615.45	
74. Laundry, lee, miscellaneous expenses.....	8,126.53		92.02				456.97		12.95	
75. Total.....	\$89,264.23		\$17,076.94				\$27,591.35		\$19,277.94	
<i>Main dredging pump.</i>										
76. Diameter of runner.....	96 inches		56 inches				50 inches		75 inches	
77. Volume (lined or unlined).....	Unlined.		Lined.				Unlined.		Unlined.	

94. Ordinary repairs.....	604.76	None.		8.73	.....
96. Laundry, ice, miscellaneous expenses, etc.	255.26	None.		116.14	.....
96. Total.....	11,160.83			7,884.88	.....
<i>Barges (smacks chargeable to dredge).</i>					
97. Ordinary repairs to barges.....	331.55	None.		789.79	.....
98. Miscellaneous expenses.....	932.42	None.		1.60	.....
99. Total field cost.....	117,138.44			40,061.88	.....
100. Total field cost per cubic yard (cents).	3.17	11.22	18,101.16	11,173+	9.09.
<i>Extra expenses.</i>					
101. Office expenses, superintendence, surveys, etc.	544.71	1,310.67		1,067.79	4,487.14
102. Extraordinary repairs to dredge:					
(a) Hull.....	284.08				.....
(b) Machinery (exclusive of main dredging pump).	15,225.95	220.37			.....
103. Extraordinary repairs to towboats and launches.	789.88				.....
104. Extraordinary repairs to barges.....	33.60				.....
105. Total.....	19,825.12				.....
106. Gross cost per cubic yard (cents).	3.7892	12.19	19,044.20	11,469+	11.37.
MISCELLANEOUS.					
107. Number of pounds of fuel per yard of material.	2.35	17.85		10,395+	14.3.
108. Fuel consumed by dredge, tons or barrels.	27,000 barrels	1,248 long tons.		1,835.3	1,368 long tons.
109. Fuel consumed by auxiliary plants, tons or barrels.		None		359.3	
110. Cost of fuel.....	\$25,728.10	\$2,868.40		\$5,575.48	\$3,865.11.
111. Water purchased.....	1,415,000 gallons.	None		None	
112. Cost of water per 1,000 gallons.....	12	do.		None	
113. Cost per cubic yard per hour at work.....		\$0.1319		\$0.1450+	2.39 cents
114. Linear feet of pipe line built during year and cost per linear foot.		None		None	
115. Linear feet of embankment built during year and cost per linear foot.		do.		do.	
105. Total.....	136,963.06			41,129.37	24,321.12

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Houston, Tex.	Humphreys, Chas.	Indiana.	Iowa.
MISCELLANEOUS—continued.				
116. Area in square feet cut over by dredge during year.	12,446,453.....	2,156,220.....	2,305,421.....	885,000.....
117. Average increase of depth of channel cut over.	8 feet.....	2 feet.....	4.72+.....	2 feet.....
	<i>Remarks.</i> Includes 83,388 cubic yards of filling at Fort Point. Includes Fort Point depot charges of \$6,973.33. 27,000 barrels, at 95 cents. 35 tons, at \$13. 1,416,000 gallons, at 12 cents per 1,000.	<i>Remarks.</i> This dredge operated on Black Warrior River from Yellow Creek Bar, mile 240.5 to Holt tippie, mile 367, dredging bars, locks, and lock approaches. 1,426.8 tons, at \$1.90. 12.5 tons, at \$1.90.	<i>Remarks.</i> Hull and upper works..... \$27,888.94 Machinery..... 59,925.00 Pumping, heating, lighting, and refrig-erating..... 4,722.95 92,534.89 During the season was tended alternately by the U. S. tow-boats Ottawa and Cayuga and U. S. gasoline boat Comet and hired tender M. D. Wayman.	<i>Remarks.</i> Dredging at following places: Coahoma (248) before dredging, 9 feet; after, 10 feet. Cat Island (256) before dredging, 7.5 feet; after, 10.5 feet. This dredge also operated in Memphis Harbor.
			<i>Location.</i> Nine Mile Bar..... 67,255 Rising Sun Bar..... 22,538 Henderson Island Bar..... 32,456 Henderson Band Bar..... 33,239 Green's Crossing..... 40,633 Cave-In-Rock Bar..... 23,648 Ball's Bar..... 16,889 Fryer's Island..... 16,236 Cumberland Island..... 14,910 Cottonwood Bar..... 68,897 Dam No. 37..... 1,806 356,897	
			2,190.64 tons, at \$2.17c. Cost of installation of new pump, Morris design, including spare parts, \$2,684.33. 9 men. At \$2.26 per ton.	

Name.	Kappa.	Mecon.	Mallory, Major J. C.	Mayon.
1. District.	St. Louis, Mo., Mississippi River Commission.	Savannah, Ga.	Jacksonville, Fla.	Rock Island, Ill.
2. When built.	1901.	1911.	1913.	1911-12.
3. Where built.	Grafton, Ill.	Jacksonville, Fla.	Baltimore, Md.	Keokuk, Iowa.
4. Builder.	Bucyrus Steam Shovel & Dredge Co.	Merrill-Stevens Co.	Ellisport Machine Corporation.	United States.
5. Time to build.	About 26 months.	6 months.	About 1 year.	About 1 year.
6. Material of hull.	Steel.	Steel.	Steel.	Crescoted fir, steel, and concrete.
7. Contract cost of dredge.	\$122,400.	\$17,875.	\$71,000 and U. S. dredge Jacksonville in exchange.	\$29,937.83. ¹
8. (a) Cost of outfit; (b) cost of pipe line.	(b) \$12,200.	(a) \$2,572.90; (b) included in (a).	(a) \$9,781.42; (b) \$13,976.66.	(a) Included in above; (b) \$6,229.06.
9. Length.	192 feet.	74 feet.	130 feet.	130 feet.
10. Beam.	44 feet.	28 feet.	33 feet.	28 feet.
11. Depth.	7 feet.	4 feet 6 inches.	9 feet.	5 feet.
12. Draft.	(a) Forward..... (b) Aft.....	2 feet 6 inches. 2 feet 4 inches.	6 feet 6 inches. 2 feet 2 inches.	26 inches. 42 inches.
13. Displacement (long tons).	834.	120.	665.59.	276.
14. Number of crew.	43.	11.	42.	19 men.
15. Number, size, and type of propelling engines.	Two, 22-inch cylinder, 7-foot stroke, Mississippi River side wheel.	None.	None.	None.
16. Number, size, and type of pumping engines.	Two, 15 and 30 by 24 inches; horizontal tandem compound, condensing.	One, 2-cylinder 8 by 8 inch vertical opposite crank directly connects 10-inch dredge pump.	One, 14 inches by 25 inches by 18 inches, compound.	One, 13 inches by 25 inches by 16 inches, cross compound, condensing.
17. Cutter engines:				
(a) Diameter of cylinders.	None.	5 inches.	104 inches.	None.
(b) Stroke.	None.	8 inches.	10 inches.	None.
18. Hauling engines:				
(a) Diameter of cylinders.	7 inches.	7 inches.	7 inches.	84 inches.
(b) Stroke.	do.	10 inches.	10 inches.	84 inches.
19. Boilers:				
(a) Number and type.	7, Mississippi River, cylindrical, fus.	1, horizontal return tubular, undrified.	2, Heine water-tube, size 7 feet 3 inches by 13 feet 8 inches by 15 feet 4 inches each.	3, Mississippi River type.
(b) Length.	30 feet.	14 feet 1 inch.	15 feet 4 inches.	20 feet 21 inches.
(c) Diameter.	44 inches.	5 feet 4 inches.	3 feet 6 inches (steam drum).	404 inches.
(d) Heating surface (total).	3,948 square feet.	1,110 square feet.	3,000 square feet.	1,116 square feet.
(e) Grate surface (total).	157.5 square feet.	30 square feet.	79.1 square feet.	48.75 square feet.
20. Discharge pipe in use (average number of feet).	500.	400.	1,400.	750 feet.
21. Diameter of discharge pipe.	31½ inches.	10 inches.	18 inches.	20 inches.
22. Pontoons:				
(a) Number and material of those in use (average).	7, steel.	12, wooden pontoons.	None.	15, composite.
(b) Dimensions.	36 by 20 feet by 3 feet 6 inches.	16 by 10 feet.	20 feet by 8 feet by 3 feet 6 inches.	50 feet by 14 feet by 3 feet 4 inches.
23. Revolutions per minute of propelling engines.	17.	None.	None.	No propelling engines.

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Kepps.	Macom.	Mallery, Major J. C.	Mayon.
24. Revolutions per minute of pumping engines.....	129	375	190	215
25. Type of agitator or cutter head.....	Water-jet agitator.	Revolving tooth and blade.	Revolving spiral.	No cutter head.
26. Diameter of cutter.....		3 feet.	5 feet 8 inches.	None.
27. Diameter of cutter shaft.....		24 inches.	7 inches to 74 inches.	Do.
28. Type of suction head.....	Upstream, with water jet.	Oblong.	Round, with hood.	Plain square.
29. Revolutions per minute of cutter head.....		12	11	No cutter head.
30. Average boiler pressure (gauge).....	123 pounds.	100 pounds.	143.3	140 pounds.
31. Kind of coal used.....	Bituminous.	Bituminous coal and wood.	Bituminous.	Bituminous lump.
32. Average gauge pressure in discharge pipe.....	12 pounds.	15 pounds.	20.89	6.4 pounds per square inch.
33. Average vacuum in suction pipe.....	11 inches.	10 inches.	8.83	24 inches of mercury.
ATTENDANT PLANT.				
Tugboat.				
34. Name of tug attached to dredge.....	None.	None.	Frank.	None regularly.
35. Number of crew.....			4	
36. Displacement.....			75, approximate.	
37. Draft:				
(a) Forward.....			5 feet.	5 feet.
(b) Aft.....			8 feet.	8 feet.
Lanaches.				
38. Name.....		No name; temporary outfit.	Mal. Various lanaches hired.	Do.
39. Length.....		20 feet.	18 feet.	
40. Beam.....		7 feet.	5 feet 10 inches.	
41. Depth.....		2 feet 8 inches.	3 feet 1 inch.	
42. Draft.....		2 feet 2 inches.	2 feet 6 inches.	
43. Displacement.....		3.9 tons.	0.95 ton.	
Barges.				
44. Identifying numbers of barges in use.....		1	U. S. No. 1.	No. 355 and No. 105.
45. Usage.....		Coal barge.		Fuel (coal) flats.
46. Displacement, light (each).....		10 tons.	Der- rick.	50 long tons each.
47. Capacity of barges (each).....		40 tons.	Fuel.	123 long tons each.
			U. S. No. 3.	
			U. S. No. 4.	
			Work.	
			Tons.	Tons.
			80.5	80.5
			80	80

WORK PERFORMED.

No.	Description of work.	Mississippi River below Cairo.				None.	St. Johns River, Jacksonville, to Rock Island to Burlington & La Crosse Canal.			
		Hours.	Minutes.	Percentage.			Hours.	Minutes.	Percentage.	
48.	Location of dredging.....									
49.	Average depth before dredging.....									
50.	Average depth after dredging.....									
51.	Character of material dredged.....									
52.	Rate of advance per hour (in feet straight ahead).....									
53.	Amount dredged during the year.....									
54.	Total amount dredged by this dredge at this locality.....									
55.	Average amount dredged: (a) Per hour (pumping)..... (b) Per day.....									
56.	Maximum amount dredged in one month.....									
57.	Total number of days upon which any dredging was done.....									
58.	Average number of working hours per working day.....									
59.	Maximum number of working hours per working day.....									

DISTRIBUTION OF TIME.

DISTRIBUTION OF TIME.												
	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
60. Time at work:												
(a) Pumping pipe line.....	396	35	4.51				3,643	50	41.4326	927	15	10.55
(b) Handling pipe line.....							498	45	5.6779	196	57	2.26
(c) Handling swinging wires (cleaning suction).....	75	20	.96				68	25	.7787	21	36	.24
(d) Going to and from wharf or anchorage.....										257	19	2.93
(e) Placing dredge.....	105	5	1.20									
(f) Waiting for vessels to pass.....	8	30	.10	1				30	.0002	21	13	.24
61. Time lost from work:												
(a) Changing location of plant.....	195	20	2.23				212	10	2.4287	246	34	2.81
(b) Bad weather.....	7	35	.09				55	55	.6439	3	18	.04
(c) Washing boilers and ordinary repairs.....	459	35	5.23				277	40	3.1670	8	7	.09
(d) Extraordinary repairs.....							1,710		19.4673	78		.89
(e) Other causes.....	7,464		84.97				848	45	9.6624		41	71.20
(f) Sundays and holidays.....	72		.82				1,440		16.3934			8.76
62. Total hours in year.....	8,784		100.00	8,784		100.00	8,784		100.0000	8,784		100.00
63. Total time at work.....	585	30	6.97				4,212	30	47.96	1,426	30	16.22
64. Total time lost from work.....	8,198	30	93.33				4,571	30	52.05	7,357	40	83.78

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Kappa.	Micron.	Mallery, Major J. C.	Mayon.
COST OF WORK.				
<i>Dredge.</i>				
65. Pay rolls.....	\$9,568.47	\$1,621.17	\$28,300.00	\$6,046.41
66. Fuel for boilers.....	4,294.38	113,131.76	113,130.12	2,204.64
67. Coal for galley.....	20.15		121.68	
68. Water.....			444.00	
69. Supplies, subsistence.....	2,763.96	333.08	6,531.71	2,103.64
70. Supplies, engine room.....	140.13	140.13	1,206.82	841.13
71. Other supplies.....	278.68	200.68	633.70	715.61
72. Renewals or additions to outfit.....		1,217.01	6,885.11	1,661.20
73. Ordinary repairs:				
(a) Hull.....	432.73	8.26	16.70	
(b) Machinery (exclusive of main dredging pump).....	2,680.36	22.60	1,665.12	
74. Laundry, ice, miscellaneous expenses.....		94.30	1,349.45	232.26
75. Total.....	\$20,831.64	\$3,894.88	\$60,780.49	\$12,260.99
<i>Main dredging pump.</i>				
76. Diameter of runner.....	84 inches.	30 inches.	72 inches.	60 inches.
77. Volume (lined or unlined).....	Lined.	Unlined.	Unlined.	Lined front and back only.
	Number purchased.....	Number purchased.....	Number purchased.....	Number purchased.....
	Number pumping hours used.....	Number pumping hours used.....	Number pumping hours used.....	Number pumping hours used.....
	Total cost.....	Total cost.....	Total cost.....	Total cost.....
78. Renewals:				
(a) Volume.....				
(b) Runner.....				
(c) Volume liners.....				
(d) Runner liners.....				
(e) Head and back liners.....				
79. Miscellaneous repairs.....	\$18.00		\$605.70	\$73.09
80. Total.....	18.00		2,294.00	71.03
				144.13

<i>Pipe line.</i>									
31. Renewals:									
(a) Rubber sleeves.....									
(b) Pipe.....	608.51								
(c) Pontoons.....									
(d) Outfit.....									
32. Repairs.....									
33. Miscellaneous.....									
34. Total.....	608.51								646.90
<i>Towboats and launches.</i>									
35. Pay rolls.....									
36. Fuel for boilers.....									
37. Coal for galley.....									
38. Water.....									
39. Supplies, subsistence.....									
40. Supplies, engine room.....									
41. Launch supplies.....									
42. Other supplies.....									
43. Renewals of or additions to outfit.....									
44. Ordinary repairs.....									
45. Laundry, ice, miscellaneous expenses, etc.....									
46. Total.....									1,237.69
<i>Barges (amounts chargeable to dredge).</i>									
47. Ordinary repairs to barges.....									
48. Miscellaneous expenses.....									
49. Total field cost.....									
50. Total field cost per cubic yard (cents).....	4.15								15,262.70
<i>Extra expenses.</i>									
51. Office expenses, superintendence surveys, etc.....									
52. Extraordinary repairs to dredge:									
(a) Hull.....									
(b) Machinery (exclusive of main dredging pump).....									
53. Extraordinary repairs to towboats and launches.....									
54. Extraordinary repairs to barges.....									
55. Total.....									9,063.88
56. Gross cost per cubic yard (cents).....	5.05								24,368.68

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name	Koppa.	Macon.	Mallery, Major J. C.	Mayon.
MISCELLANEOUS.				
107. Number of pounds of fuel per yard of material.	6.5.		12,525.	6.67 pounds.
108. Fuel consumed by dredge, tons or barrels.	1,515 long tons.	9 tons coal; 33 cords of wood.	3,362.20 tons.	843 long tons.
109. Fuel consumed by auxiliary plant, tons or barrels.		206 gallons gasoline.	311 tons.	21.1 long tons.
110. Cost of fuel.	\$4,304.53.	\$180.10.	\$4.02 and \$3.98.	\$2.766 per ton (approximate).
111. Water purchased.		None.	1,094,000.	None.
112. Cost of water per 1,000 gallons.			46.72 cents.	Do.
113. Cost per cubic yard per hour at work.			80.0688.	Do.
114. Linear feet of pipe line built during year and cost per linear foot.	1.23 cents.	None.	(°).	Do.
115. Linear feet of embankment built during year and cost per linear foot.		do.	None.	Do.
116. Area in square feet cut over by dredge during year.	5,359,400.	do.	3,688,650.	1,411,850 square feet.
117. Average increase of depth of channel cut over.	2.5 feet.		7.2 feet.	6.37 square feet.
Dredging at following places:				
Locality.	Miles below Cairo.	Average depth before dredging.	Average depth after dredging.	Remarks.
River Sky.	136	Feet. 10.0	Feet. 12	Dredge Mayon, with a double crew, was in commission in Mississippi River at Moline Pool for 31 days, at Miles 396-416 for 108 days and later on with a single crew at Le Claire dam (Mile 351) for 31 days, making a total of 189 days in commission. * Includes pontoons. * Winter repairs to dredge, winter 1916-16.
Foot Island 26.	138			
Round Lake.	139			
Yankee Bar.	170	Feet. 10.5		
Yankee Bar (lower).	171			
				13,362.20 tons or barrels, at \$4.02. * Average, includes handling. * 30 tons, at \$4.046. * 1,094,000 gallons at 46.72 cents per thousand. * 537 feet shore pipe at \$1.75 per foot; 500 feet shore pipe at \$1.95 per foot; 830 feet pontoon pipe at \$3.10. * 3 men at \$40. * 131 tons at \$3.98. * Hire of tug Frank, launches Ruth and Margie D, and derrick barge. * Includes \$500 for purchase of derrick barge.

Name.	Miller, Col. A. M.	McGregor, Robert.	Meyers.	Monstello.
1. District.....	Galveston, Tex.	Little Rock, Ark.	Savannah, Ga.	Second Portland, Oreg.
2. When built.....	1903.	1912-1914.	1907-8.	1915.
3. Where built.....	Galveston, Tex.	Dubuque, Iowa.	Baltimore, Md.	St. Helens, Oreg.: machinery, Portland, Oreg.
4. Builder.....	Bowers Southern Dredging Co.	Dubuque Boat & Boiler Works.	Ellisott Machinery Co.	(1). Wood.
5. Time to build.....	9 months.	2 years 3 months.	About 7 months.	160 calendar days.
6. Material of hull.....	Long-leaf yellow pine, copper sheathed.	Steel.	Steel.	
7. Contract cost of dredge.....	\$102,000.	\$160,174.24.	\$119,676.21.	\$27,830.
8. (a) Cost of outfit; (b) cost of pipe line.....	(a) \$10,862.45.	(a) \$4,472.62; (b) \$23,547.63.	(a) \$14,765.25; (b) \$16,724.90.	(a) \$1,415.25; (b) \$1,700.
9. Length.....	38 feet 6 inches.	236 feet 9 inches over all.	124 feet 5 inches.	103 feet 3 inches.
10. Beam.....	37 feet.	44 feet 4 inches.	33 feet.	24 feet 6 inches.
11. Depth.....	12 feet.	7 feet.	8 feet.	5 feet 10 inches.
12. Draft.....	8 feet.	3 feet 2 inches.	4 feet 8 inches.	2 feet 3 inches.
(a) Forward.....	7 feet.	3 feet 3 inches.	5 feet 10 inches.	2 feet 1 inch.
(b) Aft.....	7.10.	700.	767.	116.
13. Displacement (long tons).....	54.	42.	2 double horizontal, 12 by 14	11.
14. Number of crew.....	None.	Two 24 by 48 inch stroke, Gillette & Eaton.	2 inch stroke.	None.
15. Number, size, and type of propelling engines.....	One 14-inch and 22½-inch and 34-inch by 18-inch, vertical triple.	One 16 and 23½ and 36 by 18 inch, condensing.	One 12 and 20 and 22 inch cylinders, 20-inch stroke, triple expansion.	One 2-cylinder, 9 by 9 inch, vertical, direct connected to 10-inch Morris Machine Works sand-dredging pump.
16. Number, size, and type of pumping engines.....				
17. Cutter engines:				
(a) Diameter of cylinders.....	12 inches.	No cutter engines.	11 inches.	No cutter engines.
(b) Stroke.....	14 inches.	do.	14 inches.	
18. Hauling engines:				
(a) Diameter of cylinders.....	10 inches.	7 inches.	11½ inches.	Main engines, 10 inches.
(b) Stroke.....	12 inches.	8 inches.	12 inches.	Main engines, 13 inches.
19. Boilers:				
(a) Number and type.....	2 Heine water-tube.	3 Lyons combination water and fire tube.	2 Scotch marine boilers.	1 Scotch marine.
(b) Length.....	16 feet.	20 feet.	11 feet.	11 feet.
(c) Diameter.....	Drums 18 feet by 3 feet, tubes 15 feet 3 inches by 3½ inches.	66 inches.	do.	90 inches.
(d) Heating surface (total).....	4,270 square feet.	5,184 square feet.	2,720 square feet.	772 square feet.
(e) Grate surface (total).....	108 square feet (oil furnace used).	1,336 square feet.	90 square feet.	Old burner.
20. Discharge pipe in use (average number of feet).....	1,200 feet.	250 feet.	1,000 feet.	(c).
21. Diameter of discharge pipe.....	20 inches.	24 inches.	20 inches.	10 inches, inside diameter.
22. Pontoons:				
(a) Number and material of those in use (average).....	40 pairs, steel.	5, steel.	24, steel.	3, wood.
(b) Dimensions.....	3 feet 10 inches by 25 feet.	47 feet 6 inches by 12 feet by 3 feet.	Length, 24 feet; beam, 13 feet; depth, 3 inches.	10 by 6 by 2 feet.
23. Revolutions per minute of propelling engines.....	None.	16 (as operated).....	20; used only when being towed.	Nonpropelling.

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Miller, Col. A. M.	McGregor, Robert.	Morgan.	Montello.
24. Revolutions per minute of pumping engines.....	175.....	165.....	178.....	280.....
25. Type of agitator or cutter head.....	Open rotary.....	Water jet; no cutter head.....	Revolving-tooth cutter.....	No cutter head.
26. Diameter of cutter.....	8 feet.....	No cutter head.....	8 feet.....	
27. Diameter of cutter shaft.....	8 inches.....	.....do.....	8 inches.....	
28. Type of suction head.....	Open.....	Dust pan.....	Suction pipe elongated.....	Rectangular.
29. Revolutions per minute of cutter head.....	10 to 12.....	No cutter head.....	14.....	
30. Average boiler pressure (gauge).....	180 pounds.....	No cutter head.....	18 pounds.....	110 pounds.
31. Kind of coal used.....	Crude oil.....	Mine run; semianthracite.....	Bituminous.....	Fuel oil.
32. Average gauge pressure in discharge pipe.....	27 pounds per square inch.....	7 pounds.....	26 pounds.....	8 pounds.
33. Average vacuum in suction pipe.....	15 inches.....	15 inches.....	12 inches.....	15 inches.
ATTENDANT PLANT.				
<i>Turbosol.</i>				
34. Name of tug attached to dredge.....	Capt. Talfor; San Luis.....	J. C. Atlee (chartered plant).....	Gibbon.....	Woodland.
35. Number of crew.....	Capt. Talfor; 7; San Luis, 13.....	.....do.....	9.....	4.....
36. Displacement.....	Capt. Talfor, 43 tons; San Luis, 161.67 tons.....	Not known.....	124 tons.....	75 tons.
37. Draft:				
(a) Forward.....	Capt. Talfor, 4 feet 6 inches; San Luis, 8 feet.....	.....do.....	5 feet 6 inches.....	23 inches.
(b) Aft.....	Capt. Talfor, 7 feet; San Luis, 12 feet.....	.....do.....	9 feet.....	24 inches.
<i>Levanche.</i>				
38. Name.....	Palacios; Rona.....	None.....	None.....	
39. Length.....	Palacios, 26 feet 6 inches.....			
40. Beam.....	Palacios, 7 feet.....			
41. Depth.....	Palacios, 2 feet 5 inches.....			
42. Draft.....	Palacios, 1 foot 11 inches.....			
43. Displacement.....	Palacios, 24 tons.....			
<i>Barges.</i>				
44. Identifying numbers of barges in use.....	One, No. 5.....	B1, B2, B3, B4 ¹	Lighter No. 3; coal lighter No. 3; derrick lighter No. 3.....	Lighter No. 3; coal lighter No. 3; derrick lighter No. 3; coal lighter No. 3; coal and water; derrick lighter No. 3, handling anchors.
45. Usage.....	Oil and water.....	Fuel supply.....		Lighter No. 3, 34 tons; coal lighter No. 3, 62.45 tons; derrick lighter No. 3, 48.34 tons.
46. Displacement, light (each).....	80 tons.....	70 long tons.....		

47. Capacity of barges (each).....	265 tons.	180 long tons, maximum.	Lights: No. 2, 50 tons; coal light- No. 3, 125 tons; derrick light- No. 3, 125 tons.
WORK PERFORMED.			
48. Location of dredging.....	Corpus Christi Channel.	(a) Galveston Channel.	Port Bolivar Channel.
49. Average depth before dredging.....	8.5	(1)	22
50. Average depth after dredging.....	12	(1)	30
51. Character of material dredged.....	Mud, sand, and clay.	Arkansas River.	Savannah Harbor.
52. Rate of advance per hour (in feet straight ahead).....		Sand 85 per cent, gravel 10 per cent, mud 5 per cent.	4.6 feet.
53. Amount dredged during the year.....		248,400 cubic yards.	22 to 24 feet.
54. Total amount dredged by this dredge at this locality.....	2,015,166 cubic yards; Corpus Christi Channel, 158,138 cubic yards; Galveston Channel, 440,291 cubic yards; Texas City Channel, 1,273,227 cubic yards; Port Bolivar Channel, 56,667 cubic yards; Fort Travis, 88,843 cubic yards.	625,600 cubic yards.	24 to 26 feet.
55. Average amount dredged: (a) Per hour (pumping).....	540 cubic yards.	853 cubic yards.	
(b) Per day.....	8,940 cubic yards.	3,260 cubic yards.	439 cubic yards.
56. Maximum amount dredged in one month.....	399,713 cubic yards.	153,300 cubic yards.	6,900.9 cubic yards.
57. Total number of days upon which any dredging was done.....	225	47	231
58. Average number of working hours per working day.....	16 hours 34 minutes.	16 hours.	19 hours 35.3 minutes.
59. Maximum number of working hours per working day.....	23 hours 10 minutes.	16 hours.	24 hours.

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Miller, Col. A. M.			McGregor, Robert.			Morgan.			Montcallo.		
	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
60. Time at work:												
(a) Pumping.....	3, 799	6	43.20	323		3.67	3, 635	21	41.384			
(b) Handling pipe line.....	406	20	4.63	63		.72	337	20	3.840			
(c) Handling swinging wires (cleaning suction).....	149	25	1.71	53		.59	499	24	5.571			
(d) Going to and from wharf or anchorage.....				146		1.66						
(e) Placing dredge.....				60		.68						
(f) Waiting for vessels to pass.....				7		.06	63	5	.719			
61. Time lost from work:												
(a) Changing location of plant.....	435	5	4.97	292		3.32	301	30	3.433			
(b) Bad weather.....	183	5	2.06	2		.03	62	35	.713			
(c) Washing boilers and ordinary repairs.....	720	20	8.23	249		2.83	591	45	6.737			
(d) Extraordinary repairs.....	1, 343	10	15.31	10		.11	544		6.193			
(e) Other causes.....	250	30	2.93	5, 965		68.16	1, 343		15.289			
(f) Sundays and holidays.....	1, 438		16.95	1, 596		18.17	1, 416		16.121			
62. Total hours in year.....	8, 784		100.00	8, 784		100.00	8, 784		100.00	8, 784		100.00
63. Total time at work.....	4, 354	50	49.7	650		7.39	4, 525	10	51.514			
64. Total time lost from work.....	4, 429	10	50.3	8, 134		92.61	4, 258	50	48.486			
COST OF WORK.												
Dredge.												
65. Pay rolls.....		\$31, 136.05			\$11, 966.11				\$27, 014.45			
66. Fuel for boilers.....		22, 860.42			2, 672.60				10, 435.14			
67. Coal for galley.....		22, 524.25			39.84				279.89			
68. Water.....		239.97							73.00			
69. Supplies, subsistence.....		10, 623.77			4, 120.00				9, 917.66			
70. Supplies, engine room.....		3, 129.26			802.63				1, 006.60			
71. Other supplies.....		2, 351.45			902.64				2, 118.72			
72. Renewals or additions to outfit.....		5, 664.18			825.34				3, 369.15			
73. Ordinary repairs:												
(a) Hull.....		89.96			12.16				89.83			
(b) Machinery (exclusive of main dredging pump).....		1, 406.74			155.59				752.89			
74. Laundry, tea, miscellaneous expenses.....		10, 867.63			49.16				929.49			
75. Total.....		\$89, 098.73			\$37, 137.06				\$46, 956.86			

	64 inches Unlined.				69 inches Lined.				79 inches Unlined.			
	Number pur- chased.	Number pumping hours used.	Total cost.		Number pur- chased.	Number pumping hours used.	Total cost.		Number pur- chased.	Number pumping hours used.	Total cost.	
76. Diameter of runner.....												
77. Value (lined or unlined).....												
<i>Main dredging pump.</i>												
78. Renewals:												
(a) Valve.....												
(b) Runner.....												
(c) Valve liners.....												
(d) Runner liners.....												
(e) Head and back liners.....												
79. Miscellaneous repairs.....												
Total.....			3,478.62				\$37.50					681.06
80. Total.....												
<i>Pipe line.</i>												
81. Renewals:												
(a) Rubber sleeves.....												
(b) Pipe.....			1,718.90.				\$140.69					
(c) Penstocks.....			408.98									
(d) Outfit.....												
82. Repairs.....			284.47				\$7.49					
83. Miscellaneous.....			2,757.71				12.00					
Total.....			5,167.04									7,016.68
84. Total.....												
<i>Toeboards and launches.</i>												
85. Pay roll.....			\$6,912.12				\$804.64					
86. Fuel for boilers.....			2,968.49				\$13.28					
87. Coal for galley.....			208.42									
88. Water.....			8.74									
89. Supplies, miscellaneous.....			1,342.03									
90. Supplies, engine room.....			613.42									
91. Launch supplies.....			708.66									
92. Other supplies.....			228.09									
93. Renewals of or additions to outfit.....			351.87									
94. Ordinary repairs.....			518.82									
95. Laundry, ice, miscellaneous expenses, etc.....			168.36				\$3,683.34					
Total.....			14,510.09									8,920.46
96. Total.....							4,176.26					

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name	Miller, Col. A. M.	McGregor, Robert.	Korpsen.	Monticello.
COST OF WORK—continued.				
<i>Barges (amounts chargeable to dredge).</i>				
97. Ordinary repairs to barges.....	631.43	\$ 217.37	.....	.....
98. Miscellaneous expenses.....	.....	38.62	.....	.....
	631.43	253.99	.....	.....
99. Total field cost.....	112,880.90	.....	72,195.06	.....
100. Total field cost per cubic yard (cents).....	5.1063	.....	4.592	.....
<i>Extra expenses.</i>				
101. Office expenses, superintendence, surveys, etc.	8,306.56	4,979.46	2,646.78	.....
102. Extraordinary repairs to dredge:				
(a) Hull.....	1,881.88	.....	\$ 2,806.16	.....
(b) Machinery (exclusive of main dredging pump).....	10,498.76	306.90	\$ 7,287.23	.....
103. Extraordinary repairs to towboats and launches.....	1,241.35	.....	1,439.46	.....
104. Extraordinary repairs to barges.....	238.42	48.00	2,963.88	.....
	22,226.97	5,324.44	19,083.49	.....
105. Total.....	135,107.87	31,629.87	92,278.55	.....
106. Gross cost per cubic yard (cents).....	6.7045	11.01	5.788	.....
MISCELLANEOUS.				
107. Number of pounds of fuel per yard of material.....	3.83 pounds.	2.2 pounds.	4.24 pounds.	.....
108. Fuel consumed by dredge, tons or barrels.....	24,084 barrels.	817 tons.	2,813.37 tons.	.....
109. Fuel consumed by auxiliary plant, tons or barrels.....	.....	156 tons.	203.6 tons.	.....
110. Cost of fuel.....	\$0.95 per barrel.	\$9,230.36.	\$11,209.80.	.....
111. Water purchased.....	2,000,000 gallons.	None.	61,450 gallons.	.....
112. Cost of water per 1,000 gallons.....	\$0.12 per 1,000 gallons.	.....	\$0.06.	.....
113. Cost per cubic yard per hour at work.....	.....	\$0.0769.	\$0.03799.	.....
114. Linear feet of pipe line built during year.....	.....	None built.	.....	.....
115. Linear feet of pipe line built during year and cost per linear foot.....	.....	None built.	.....	.....

116. Area in square feet cut over by dredge during year. 117. Average increase of depth of channel cut over.	Remarks.	Remarks.	Remarks.	Remarks.
1,140,000.....	4.3 feet.....	Labor cost of work done by crew on operating main dredging pump, pipe line, and barges not separable. Fuel purchased by short ton of 2,000 pounds. Additional towing and survey service in connection with these operations were: Snag boat Arkansas, 20 days; snag boat Quapaw, 21 days; snag boat C. B. Reese, 4 days; and hired boat Miller, 15 days; and hired boat Wolverine, 16 days. The charter rate for the J. C. Atlee included everything except fuel. The cost to the work of the other boats is included in item 95; one-half to dredge Robert McGregor and one-half to dredge H. S. Taber. These barges used interchangeable between dredges Robert McGregor and H. S. Taber and costs in connection therewith divided equally between the two dredges. Coal was also procured in coal-company barges. One day after dredging. 805 tons of coal, at \$3.32. 12 tons, at \$3.32. 15 pipe-line gaskets for spare stock; cost divided equally between dredges Robert McGregor and H. S. Taber. 152 tons at \$3.32. 4 tons at \$3.32. Includes \$67.93 repairs to pile sinkers.	Morgan laid up from Nov. 1, 1916, to Dec. 31, 1916, for repairs on account of collision. Work during calendar year has been maintenance of channel. 813.37 tons, at —. 33.5 tons, at —. 14,600 gallons, at \$5 per M. \$2,057.02 expended for repairs on account of collision. \$4,371.15 expended for repairs on account of collision.	Builders: Hull and house, St. Helens Ship Building Co. St. Helens, Oreg.; machinery, Willamette Iron & Steel Works, Portland, Oreg. \$700 of this amount is included in the contract cost of dredge. Suction outfit not operated during the year.

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916.

Name.....	Multnomah.	Muscogez.	No. 6.	Orange.
1. District.....	Second Portland, Ore.....	Montgomery, Ala.....	Mobile, Ala.....	Dallas, Tex.
2. When built.....	1913.....	1904.....	1908.....	1912.....
3. Where built.....	Portland, Ore.....	Bainbridge, Ga.....	Tuscaloosa, Ala.....	Baltimore, Md.
4. Builder.....	Portland Iron Works.....	M. A. Sweeney Shipyard & Foundry Co.....	United States.....	Ellisott Machine Corporation.
5. Time to build.....	17 months.....	7 months.....	Steel and wood.....	7 months.
6. Material of hull.....	Steel.....	Yellow pine.....	\$3,000 for hull.....	Wood.
7. Contract cost of dredge.....	\$174,226.50.....	\$12,900.....	(a) \$5,000 for cabin and machinery.	\$84,550.
8. (a) Cost of outfit; (b) cost of pipe line.....	(a) \$3,108.25; (b) \$27,341.....	(a) Included in contract cost.....	122 feet 6½ inches.....	115 feet.
9. Length.....	260 feet 4½ inches (hull proper, 183 feet 11 inches).....	120 feet.....	24 feet.....	36 feet.
10. Beam.....	30 feet (hull proper, 38 feet).....	30 feet.....	5 feet.....	9 feet 6 inches.
11. Depth.....	9 feet 6 inches.....	7 feet 6 inches.....	2 feet.....	5 feet.
12. Draft.....	6 feet 6 inches.....	2 feet 6 inches.....	2 feet 1 inch.....	4 feet 8 inches.
13. Displacement (long tons).....	5 feet 8 inches.....	2 feet 6 inches.....	1 foot 2 inches.....	547.
14. Number of crew.....	435.....	300.....	91.....	84.
15. Number, size, and type of propelling engines.....	45.....	19.....	None.....	One triple-expansion 10 by 14 inches and 2½ inches stroke, 14 inches.
16. Number, size, and type of pumping engines.....	None.....	None; nonpropelling.....	One 8 by 8 upright direct-connected Morris.....	10½ inches.
17. Cutter engines:	One 19 and 30 and 35 and 35 by 16 inch stroke, 4-cylinder triple-expansion angle engine.....	One 12 and 20 by 12 inch stroke.....	5 inches.....	10 inches.
(a) Diameter of cylinders.....	8-inch and 16-inch double-cylinder tandem.....	8 inches.....	do.....	7 inches.
(b) Stroke.....	12 inches.....	10 inches.....	5-inch, single-drum.....	10 inches.
18. Haul engines:	9 inches.....	8 inches.....	6 inches.....	2 Scotch tubular.
(a) Diameter of cylinders.....	12 inches.....	12 inches.....	No. 32883 horizontal tubular No. 1.....	11 feet 9 inches.
(b) Stroke.....	4 Hawkes marine.....	1 Scotch marine, waterback.....	4 feet 8 inches.....	2,470.5 square feet.
(c) Number and type.....	13 feet 11 inches, length of drum or shaft.....	17 feet 5 inches over all.....	846 square feet.....	91 square feet.
(d) Length.....	78 shafts.....	8 feet.....	20.38 square feet.....	1,000.
(e) Diameter.....	0.120 square feet.....	246 square feet.....	100.....	15 inches.
(f) Grate surface (total).....	236 square feet.....	100.....	8 inches.....	
20. Discharge pipe in use (average number of feet).....	1,765.....	100.....		
21. Diameter of discharge pipe.....	24 inches, inside diameter.....	12 inches.....		

20. Pontoon: (a) Number and material of those in use (average). (b) Dimensions.	60, wood. 26 feet 8 inches by 12 feet 4 inches by 2 feet 5 inches. Nonpropelling.	8, steel. 4 feet by 13 feet by 18 inches. None.	2, wood. Length, 10 feet; beam, 6 feet; depth, 2 feet. None.	30 pairs, wood. 18 feet 10 inches by 4 feet 4 inches by 4 feet.
23. Revolutions per minute of propelling engines.	190 to 215.	272.	200.	235.
24. Revolutions per minute of pumping engines.	Spiral. 7 feet 11 inches over all. 74 inches.	Conical. 40 inches. 40 inches.	Straight blade, rotary. 38 inches. 34 inches.	5-blade, open type. 5 feet 5½ inches. 64 inches. Flared pipe. 10. 185 pounds. Fuel oil. 18 pounds.
25. Type of agitator or cutter head.	Open, elliptical. 8.	Suction from within cutter head.	Plain ripple.	
26. Diameter of cutter shaft.	185 pounds.	135 pounds.	90 pounds.	
27. Type of suction head.	Hogged wood.	Bituminous.	Bituminous.	
28. Revolutions per minute of cutter head.	34 pounds.	7 pounds.	No gauge used.	
29. Average boiler pressure (gauge).	17 inches.	22 inches.	.do.	12 pounds.
30. Kind of coal used.				
31. Average gauge pressure in discharge pipe.				
32. Average gauge pressure in suction pipe.				
33. Average vacuum in suction pipe.				
ATTENDANT PLANT.				
<i>Towboat.</i>				
24. Name of tug attached to dredge.	H. M. Adams	Columbus (at intervals).	None.	Beaumont.
35. Number of crew.	4.	20.	20.	2.
36. Displacement.	95 tons.	231 tons.	231 tons.	32.
37. Draft: (a) Forward. (b) Aft.	5 feet 4 inches. 7 feet.	2 feet 6 inches. .do.		2 feet 10 inches. 5 feet.
<i>Launches.</i>				
38. Name.	None.	Eufaula.	None.	
39. Length.		27 feet 6 inches.		
40. Beam.		7 feet 3 inches.		
41. Depth.		2 feet 4 inches.		
42. Draft.		1 foot 6 inches.		
43. Displacement.		75 tons.		
<i>Barges.</i>				
44. Identifying numbers of barges in use.	4, 5, 6, and 7.	20.	2.	4.
45. Usage.	Barging fuel.	Coal.	Coaling dredge.	Water, oil, and anchor and shore pipe.
46. Displacement, light (each).	118 tons.	112 tons.	51.	
47. Capacity of barges (each).	400 tons.	250 tons.	200.	

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name	Mullnohah.			Muscoyee.			No. 6.			Orange.		
	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
WORK PERFORMED.												
18. Location of dredging.....				Lower Columbia River.....			Chattahoochee River, Ga. and Ala.....			Black Warrior River, Ala.....		
19. Average depth before dredging.....	2½ feet.....			2½ feet.....	3 feet.....		3 feet.....			5.3 feet.....		
20. Average depth after dredging.....	30½ feet.....			30½ feet.....	6 feet.....		6 feet.....			7.5 feet.....		
31. Character of material dredged.....				Sand, small per cent gravel.....			Sand and gravel.....			Sand, gravel, and mud.....		
32. Rate of advance per hour (in feet straight ahead).....				11.315.....	26 feet.....		26 feet.....			5.27 feet.....		
33. Amount dredged during the year.....				2,501,100 cubic yards.....			73,486 cubic yards.....			21,329 cubic yards.....		
34. Total amount dredged by this dredge at this locality.....				6,346,345 cubic yards.....			do.....			do.....		
35. Average amount dredged:												
(a) Per hour (pumping).....				694 cubic yards.....			250 cubic yards.....			36 cubic yards.....		
(b) Per day.....				13,428 cubic yards.....			1,419 cubic yards.....			251 cubic yards.....		
36. Maximum amount dredged in one month.....				404,800 cubic yards.....			28,000 cubic yards.....			6,186 cubic yards.....		
37. Total number of days upon which any dredging was done.....	187.....			53.....			6.....			85.....		
38. Average number of working hours per working day.....	20.681.....			6.....			16 hours 30 minutes.....			22 hours 6 minutes.....		
39. Maximum number of working hours per working day.....	21.....			7.....			24 hours.....			24 hours.....		
DISTRIBUTION OF TIME.												
40. Time at work:	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
(a) Pumping.....	3,768.....	55.....	42.907.....	294.....	3.35.....	1,072.....	12.20+.....	3,553.....	50.....	40.5.....		
(b) Handling pipe line.....	14.....	25.....	.506.....	32.....	.37.....	157.....	.65.....	1,055.....	55.....	12.0.....		
(c) Handling winding wires (cleaning station).....	40.....	40.....	.463.....	14.....	.16.....	124.....	1.41+.....	169.....	40.....	1.9.....		
(d) Going to and from wharf or anchorage.....							28+.....					
(e) Placing dredge.....	2.....		.023.....	5.....	.06.....	49.....	.79+.....					
(f) Waiting for vessels to pass.....	11.....	20.....	.129.....	5.....	.06.....	81.....	.92+.....			163.....	5.....	2.2.....

61. Time lost from work:	85	968	43	30	60	128	1.46-	506	55
(a) Changing location of plant.....	573	6,532				570	6.40-	48	40
(b) Bad weather.....	345	3,929	2		.02	31	.38+	600	10
(c) Washing boilers and ordinary repairs.....	2,375	26,903							
(d) Extraordinary repairs.....	20	25,920						1,990	10.9
(e) Other causes.....	221	2,520	8,183		93.16	6,189	59.07+	283	36
(f) Sundays and holidays.....	1,416	16,120	204		2.32	1,440	16.40-	1,440	2.9
Total hours in year.....	8,784	100,000	8,784		100.00	8,784	100.00	8,784	100.00
Total time at work.....	3,867	44,027	331	30	4.00	1,425		4,972	30
Total time lost from work.....	4,916	55,973	8,452	30	96.00	7,358		3,811	30
COST OF WORK.									
<i>Dredge.</i>									
65. Pay rolls.....	\$31,794.30							\$3,514.30	\$30,326.72
66. Fuel for boilers.....	7,097.30							263.41	7,077.55
67. Coal for galley.....	4,206.15							4.61	101.75
68. Water.....	445.00								52.36
69. Supplies, subsistence.....	7,093.52							552.94	5,270.86
70. Supplies, engine room.....	2,252.61							26.86	1,880.50
71. Other supplies.....	933.00							203.38	700.10
72. Renewals or additions to outfit.....	2,536.55								1,566.05
73. Ordinary repairs:									
(a) Hull.....	28.95								310.14
(b) Machinery (exclusive of main dredging pump).....	465.92							4.67	4,044.73
74. Laundry, ice, miscellaneous expenses.....	980.00								109.25
75. Total.....	\$53,445.20							\$4,623.03	\$45,929.00

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.	Multnomah.		Macoe.		No. 6.		Orange.	
	No. purchased.	Number pumping hours used.	Total cost.	Number put- chased.	Number pumping hours used.	Total cost.	Number put- chased.	Number pumping hours used.
COST OF WORK—continued.								
Main dredging pump.								
76. Diameter of runner.	6 feet 4 inches.	Lined.		42 inches.	Unlined.	28 inches.	Unlined.	60 inches.
77. Volume (lined or unlined).								
78. Renewals:								
(a) Volume.	1 Indefinite	\$1,425.00						
(b) Runner.	2 (1)	645.00						
(c) Volume liners.	91 Various	500.96						
(d) Runner liners.								
(e) Head and back liners.	23 Various	1,242.64						
79. Miscellaneous repairs.		103.00						
80. Total.		\$3,944.60						
Pipe line.								
81. Renewals:								
(a) Rubber sleeves.	118 880-7, 620	628.42		24	294	\$438.78	24	\$503.16
(b) Pipe.	7	924.25					1,060	1,318.76
(c) Pontoons.		4.92						
(d) Outfit.		163.88						
82. Repairs.		166.57						
83. Miscellaneous.		52.80						
Total.		2,245.84				\$438.78		\$2,051.73

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.	Multnomah.	Muscogee.	No. 6.	Orange.
MISCELLANEOUS.				
107. Number of pounds of fuel per yard of material.	0.945 cubic feet, 24.57 pounds, hogged wood.	6.4.....	17.82.....	3.5.....
108. Fuel consumed by dredge, tons or barrels.	2,365,766 cubic feet hogged wood.	210 tons.....	190 tons.....	12,372.52 barrels.
109. Fuel consumed by auxiliary plant, tons or barrels.	1,613.1 barrels oil.	355 gallons.....	None.....	9,139 gallons.
110. Cost of fuel.....	\$8,707.99.....	\$2.82 per ton.....	\$273.02.....	\$13,804.85
111. Water purchased.....	90,000 gallons.....		None.....	201,020 gallons.
112. Cost of water per 1,000 gallons.....	\$0.50.....	\$0.0685.....	..do.....	\$0.24
113. Cost per cubic yard per hour at work.	None.....		None.....	\$0.053
114. Linear feet of pipe line built during year and cost per linear foot.	..do.....		..do.....	No data.
115. Linear feet of embankment built during year and cost per linear foot.	13,128,000.....	676,500.....	266,115.....	
116. Area in square feet cut over by dredge during year.	5 feet.....	3 feet.....	2.2.....	Approximately 3 feet.
117. Average increase of depth of channel cut over.	<i>Remarks.</i> 1 Does not include outfit, pipe line, nor attendant plant. 2 Includes 80 pontoons, 2,400 feet pontoon pipe, and 80 feet of shore pipe, etc. 3 2,365,766 cubic feet of hogged wood, 24 pounds per cubic foot at 30 cents per 100 cubic feet. 4 About 23 tons, at \$7.10. 5 90,000 gallons, at \$0.50 M. 6 With head and back. 7 Two runners last about 4,000 pumping hours. 8 Number used. 9 1,613.1 barrels, at \$0.75 and \$1.10. 10 Supplied from dredge. 11 Includes alterations to pilot house. Labor cost of crew operating main dredging pump, \$18,707.27; pipe line, barges, and anchors, \$16,260.42; extra labor, \$230.50.	<i>Remarks.</i> 1 210 tons, at \$2.82. Labor cost of work done by crew in operating Main dredging pump..... \$1,983.00 Pipe line..... 315.00 Barges..... 90.00 All coal purchased by long ton. This plant operated only during the months of September, October, and November, 1916, the balance of the year being tied up. 3 355 gallons, at 23 cents.	<i>Remarks.</i> 1 Laid up. 2 12,372.52 barrels, at \$0.916+. 3 9,139 gallons, at \$0.186+.	

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.	Oregon.	Pascagoula.	Pelto.	Pelto.
1. District.	Elst, Portland, Ore.	Mobile, Ala.	Rock Island, Ill.	Montgomery, Ala.
2. When built.	1908.	1909.	1907-9.	1907-9.
3. Where built.	Portland, Ore.	Baltimore, Md.	South Sullwater, Minn.	Hull, Gulfport, Miss.; ex- posed, Ala.
4. Builder.	Portland Iron Works.	Fillicott Machine Corporation.	United States.	United States.
5. Time to build.	9 months.	74 months.	9 months.	1 year.
6. Material of hull.	Wood, Oregon fir.	Steel.	Wood.	Reconstituted yellow pine.
7. Contract cost of dredge.	\$79,740.	\$145,500, including all attendant plant.	\$32,937.67.	
8. (a) Cost of outfit; (b) cost of pipe line.	(a) \$19,162.58; (b) included in item 7.	(a) \$53,531.71.	(a) Included in above; (b) \$3,153.47.	(a) \$62,352.25; (b) \$2,083.80.
9. Length.	120 feet.	150 feet.	119 feet.	135 feet.
10. Beam.	36 feet.	40 feet.	30 feet.	35 feet.
11. Depth.	11 feet.	10 feet 6 inches.	5 feet.	6 feet 6 inches.
12. Draft.	(a) Forward..... (b) Aft.....	5 feet 9 inches. 5 feet 9 inches.	2 feet 7½ inches. 2 feet 1½ inches.	4 feet. 4 feet 3 inches.
13. Displacement (long tons).	945.	71.	125.	488.
14. Number of crew.	20.	41.	9.	40.
15. Number, size, and type of propelling engines.	None.	None.	No propelling engines.	2 horizontal direct-acting cylin- ders.
16. Number, size, and type of pumping engines.	1 compound ball engine 18 by 28 inches diameter, 37 18-inch stroke.	One 12 by 20 by 33 by 20 inch triple expansion.	One 12-inch and 21-inch by 14- inch cross compound, conden- sing.	1 cross compound (Ball Engine Co.), 15 by 72 inches, 13 by 20 by 16 inch stroke.
17. Cutter engines:			No cutter engines.	8½ inches. 12 inches.
(a) Diameter of cylinders.	10 inches.	11 inches.		12 inches.
(b) Stroke.	10 inches.	14 inches.		7 inches.
18. Haul engines:			8½ inches.	10 inches.
(a) Diameter of cylinders.	8 inches.	8½ inches.	10 inches.	
(b) Stroke.	10 inches.	12 inches.		
19. Boiler:				
(a) Number and type.	2 Itine pipe boilers.	2 Scotch marine.	2 Hawkes.	2 western river type, 5 flues each
(b) Length.	18 feet.	12 feet.	16 feet.	30 feet.
(c) Diameter.	40 inches.	11 feet 6 inches.	60 inches.	30 inches.
(d) Heating surface (total).	4,500 square feet.	3,500 square feet.	2,600 square feet.	1,755 square feet.
(e) Grate surface (total).	1,300 square feet.	1,000 square feet.	750 square feet.	45 square feet.
20. Discharge pipe in use (average num- ber of feet).	1,300.	1,151.	735 feet.	240 feet.
21. Diameter of discharge pipe.	18 inches.	20 inches.	17 inches.	15 inches.
22. Pumps:			10, wood.	10, steel.
(a) Number and material of those in use (average).	40, wood.	58, wood.	50 feet by 12 feet by 2 feet 3 inches.	4 feet by 16 feet by 22 inches.
(b) Dimensions.	20 by 10 by 2 feet.	25 feet 4 inches by 4 feet 8 inches by 5 feet.		

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Oregon.	Paragould.	Pala.	Pdusa.
23. Revolutions per minute of propelling engines.....	None.	None.	No propelling engines.....	18.
24. Revolutions per minute of pumping engines.....	203.	180.	245.	244.
25. Type of agitator or cutter head.....	Revolving spiral.	Elliptic spiral.	No cutter head.	Spiral type, revolving.
26. Diameter of cutter.....	4 feet 6 inches.	9 feet 1 inch (over blades).	None.	4 feet 11 inches.
27. Diameter of cutter shaft.....	7½ inches.	7 inches (increased to 8½ inches at cutter).	30.	6 inches.
28. Type of suction head.....	Open elliptical.	Elliptic.	Plain square.	Suction within cutter head.
29. Revolutions per minute of cutter head.....	130 pounds.	12.	No cutter head.	7.
30. Average boiler pressure (gauge).....	Natural crude oil (dehydrated).	106 pounds.	45 pounds.	150 pounds.
31. Kind of coal used.....	32 pounds.	Bituminous.	Bituminous lump.	Bituminous.
32. Average gauge pressure in discharge pipe.....	17 inches.	18½ pounds.	16 pounds per square inch.	12 pounds.
33. Average vacuum in suction pipe.....		8.4 inches.	15 inches.	20 inches.
ATTENDANT PLANT.				
<i>Towboat.</i>				
34. Name of tug attached to dredge.....	None.	Tuscaloosa and Horace Harding.	None regularly.	Alabama.
35. Number of crew.....		9 each.		18.
36. Displacement.....		212 and 215 tons.		260 long tons.
37. Draft.....		5 feet 6 inches and 6 feet 4 inches.		2 feet 6 inches.
(5) Forward.....		8 feet 6 inches and 8 feet 2 inches.		3 feet.
(6) Aft.....				
<i>Launches.</i>				
38. Name.....	Waller.	Bilford.	None regularly.	None.
39. Length.....	45 feet.	40 feet.		
40. Beam.....	13 feet.	13 feet.		
41. Depth.....	3 feet 6 inches.	4 feet 7 inches.		
42. Draft.....	1 foot 8 inches.	4 feet 1 inch.		
43. Displacement.....	12 tons.	25 tons.		
<i>Barges.</i>				
44. Identifying numbers of barges in use.....	Nos. 13 and 14.	G and H.	No. 239 and No. 239.	Nos. 13, 28, and 43.
45. Uses.....	Fuel and water.	Coal and water.	Fuel (coal) flats.	Coal and extra pairs.
46. Displacement, light (each).....	Total, 42 tons.	104 tons and 23 tons.	32 long tons.	No. 13, 28 tons; No. 28, 90 tons;
47. Capacity of barges (each).....	Total, 110 tons.	340 tons and 64 tons.	130 long tons.	No. 13, 28 tons; No. 28, 300 tons; No. 43, 260 tons.

WORK PERFORMED.

48. Location of dredging.....	Tillamook Bay, Oreg.....	(1)	Mississippi River, vicinity of St. Paul.....	Alabama River, Ala.
49. Average depth before dredging.....	8 feet.....	(1)	3.2 feet.....	2.29 feet.
50. Average depth after dredging.....	16 feet.....	(2)	8.2 feet.....	6 feet.
51. Character of material dredged.....	Sand, gravel, mud, and shells.....	(2)	Mud, sand, clay, and shells.....	Gravel, 65 per cent; sand, 35 per cent.
52. Rate of advance per hour (in feet straight ahead).....	7.1.....	20	11.7.....	13.892.
53. Amount dredged during the year.....	752,537 cubic yards.....		1,467,403.4 cubic yards.....	155,307 cubic yards.
54. Total amount dredged by this dredge at this locality.....	936,049 cubic yards.....		1,637,844.6 cubic yards.....	1,647,120 cubic yards.
55. Average amount dredged: (a) Per hour (pumping).....	453 cubic yards.....		818.7 cubic yards.....	228,057 cubic yards.
(b) Per day.....	3,064 cubic yards.....		12,228.4 cubic yards.....	2,445 cubic yards.
56. Maximum amount dredged in one month.....	102,975 cubic yards.....		598,679.8 cubic yards.....	60,111 cubic yards.
57. Total number of days upon which any dredging was done.....	244.....	120	87.....	63.
58. Average number of working hours per working day.....	7 hours 20 minutes.....	18.61 hours	14 hours 12 minutes.....	10 hours 51 minutes.
59. Maximum number of working hours per working day.....	8 hours.....	24	16 hours.....	15 hours 5 minutes.

DISTRIBUTION OF TIME.

	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
60. Time at work:									
(a) Pumping.....	1,663		18.93	1,792	18	20.40	909	30	10.35
(b) Handling pipe line.....	95	55	1.09	260	39	2.97	84	25	.96
(c) Handling swinging wires (cleaning suction).....	22	35	.26	128	8	1.46	156	25	1.78
(d) Going to and from wharf or anchorage.....	8	10	.09	39	17	.45	29	50	.34
(e) Placing dredge.....				12	55	.15	37	5	.42
(f) Waiting for vessels to pass.....							16	20	.18
61. Time lost from work:									
(a) Changing location of plant.....	99	30	1.14	365	46	4.16	79	35	.90
(b) Bad weather.....	51		.59	419	50	4.78			
(c) Washing boilers and ordinary repairs.....	157	25	1.79	544	25	6.20			
(d) Extraordinary repairs.....	148		1.68	13	46	.16	160	15	1.85
(e) Other causes.....	1,598	25	58.04	3,766	56	42.88	6,830	35	77.78
(f) Sundays and holidays.....	1,440		16.39	1,440		16.39	480		5.46
62. Total hours in year.....	8,764		100.00	8,764		100.00	8,764		100.00
63. Total time at work.....	1,789	40	20.37	2,233	17	25.42	1,233	35	14.03
64. Total time lost from work.....	6,994	20	79.63	6,550	43	74.58	7,550	25	85.97
								9	90.63

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Oregon.	Pascagoula.	Pelée.	Peltus.
COST OF WORK.				
<i>Dredge.</i>				
65. Pay rolls.....	\$16,043.33	\$21,624.96	\$5,158.54	\$5,698.83
66. Fuel for boilers.....	\$11,341.51	\$4,745.01	2,392.03	1,008.79
67. Coal for galley.....	\$200.40	7 41.15		
68. Water.....	\$139.70	\$90.12		
69. Supplies, subsistence.....	3,234.86	5,411.91	1,031.50	1,866.12
70. Supplies, engine room.....	701.39	814.76	428.85	78.96
71. Other supplies.....	397.45	334.91	217.78	378.92
72. Renewals or additions to outfit.....	1,598.12	1,787.03	286.28	548.88
73. Ordinary repairs:				
(a) Hull.....	28.97	752.94		
(b) Machinery (exclusive of main dredging pump).....	370.00	532.93	62.71	1,069.54
74. Laundry, ice, miscellaneous expenses.....	221.58	262.87	94.70	1,059.98
75. Total.....	\$34,339.33	\$36,398.59	\$9,732.39	\$11,750.80
<i>Main dredging pump.</i>				
76. Diameter of runner.....	6 feet.	72 inches.	50 inches.	4 feet, 2 inches.
77. Volume (lined or unlined).....	Lined.	Unlined.	Lined front and back only.	Lined.
	Number purchased.....	Number purchased.....	Number purchased.....	Number purchased.....
	Number pumping hours used.....	Number pumping hours used.....	Number pumping hours used.....	Number pumping hours used.....
	Total cost.....	Total cost.....	Total cost.....	Total cost.....
78. Renewals:				
(a) Volute.....	1			
(b) Runner.....	1,920			
(c) Outside liners.....	2			
(d) Head and back liners.....	11			
(e) Head and back liners.....	6,562			
79. Miscellaneous repairs.....	275.77			
80. Total.....	1,658.58		526.53	30.00
				\$235.34
				75.00
				30.00

240.34

Pipe line.		16	54	(1)	81,525.80	55.00	11	405.00	908.51
81. Renewals:		630.00	12	None.	4,965.60				
(a) Rubber sleeves.		2,582.60							
(b) Pipe.									
(c) Pontoons.		984.35							
(d) Outfit.		103.47			4,014.71			502.51	
82. Repairs.		51.69			8.00	20.87			
83. Miscellaneous.									
84. Total.		4,412.11			10,514.11		75.87		
<i>Towboats and launches.</i>									
85. Pay rolls.				4,533.33				4,114.08	
86. Fuel for boilers.				1,052.77				1,830.00	
87. Coal for galley.				111.67					
88. Water.				14.49				1,241.83	
89. Supplies, subsistence.				1,190.00				83.25	
90. Supplies, engine room.				201.10		170.24			
91. Launch supplies.				824.17					
92. Other supplies.				160.64		6.75		235.09	
93. Renewals of or additions to outfit.				33.94				820.06	
94. Ordinary repairs.				692.04		56.50		2,098.95	
95. Laundry, ice, miscellaneous expenses, etc.				33.23				46.70	
96. Total.		3,610.00			8,977.38	233.49		10,466.16	
<i>Barges (amounts chargeable to dredge).</i>									
97. Ordinary repairs to barges.				2.25					
98. Miscellaneous expenses.		143.50			2.25				
99. Total field cost.		44,083.52			55,592.33	10,577.27		16,123.36	
100. Total field cost per cubic yard (cents).	5.7		3.79			5.39	8.409		
<i>Extra expenses.</i>									
101. Office expenses, superintendence, surveys, etc.		881.28		5,343.27		729.03		3,374.78	
102. Extraordinary repairs to dredge:									
(a) Hull.				153.15		292.01			
(b) Machinery (exclusive of main dredging pump).		1,832.05		1,300.55		2,015.00			
103. Extraordinary repairs to towboats and launches.				310.84					
104. Extraordinary repairs to barges.		46.20		395.05					
105. Total.		46,823.05		7,561.86		3,087.04			
106. Gross cost per cubic yard (cents).	6.3		4.30		13,614.31			19,498.14	
					6.94			10.583	

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Oregon.	Pascagoula.	Pelée.	Pettus.
MISCELLANEOUS.				
107. Number of pounds of fuel per yard of material.	3.7.....	3.07.....	7.37.....	6.26.....
108. Fuel consumed by dredge, tons or barrels.	8,472.3 barrels.....	2,044 long tons.....	5.1 long tons.....	405 long tons.....
109. Fuel consumed by auxiliary plant, tons or barrels.	(^a).....	444.5 long tons.....	5.81 long tons.....	702 long tons.....
110. Cost of fuel.....	\$1,308 and \$1,758 per barrel.	\$2,837.60.....	\$3.07 per ton.....	\$2.79 per long ton.
111. Water purchased.....	596,840 gallons.....	455,900 gallons.....	None.....	None.....
112. Cost of water per 1,000 gallons.....	Average, \$0.234.....	\$0.24.....	do.....	\$0.0584.
113. Cost per cubic yard per hour at work.	90.064.....	\$0.0281 ^a	None.....	No record.
114. Linear feet of pipe line built during year and cost per linear foot.	900 feet, at \$2.87 per foot.....	900 feet discharge pipe, at \$4.55 per foot. None.....	None.....	None.
115. Linear feet of embankment built during year and cost per linear foot.	2,290,000.....	8,038,458.....	1,061,500.....	1,132,235.
116. Area in square feet cut over by dredge during year.	8 feet.....	(^a).....	5 feet.....	3.71 feet.
117. Average increase of depth of channel cut over.	Remarks. 1 Includes nights. 2 8,472.3 barrels, at \$1.338. 3 14.25 tons, at \$14.06. 4 596,840 gallons, at \$0.234. 5 Launch Walter hired complete. Fuel purchased by barrel, weighing 225 pounds.	Remarks. All coal was purchased by the short ton and is so expressed above. The dredge was out of commission for a period of 4 months on account of lack of funds and damage from hurricane of July 5, 1916. 1 Pascagoula Harbor, Miss.; Gulfport Harbor, Miss.; Wolf and Jordan Rivers, Miss.; and Biloxi Harbor, Miss. 2 Pascagoula Harbor, Miss., 15.9 feet; Gulfport Harbor, Miss., 16.8 feet; Wolf and Jordan Rivers, Miss., 5.8 feet; Biloxi Harbor, Miss., 6.3 feet. 3 Pascagoula Harbor, Miss., 21.2 feet; Gulfport Harbor, Miss., 22.4 feet; Wolf and Jordan Rivers, Miss., 10.5 feet; Biloxi Harbor, Miss., 10.4 feet.	Remarks. Dredge Pelée was in commission 106 days, dredging for steamboat channel in the Mississippi River, vicinity of Omaha Bridge, Mile 5, and Lock and Dam No. 1 above St. Paul, and Mile 9 below St. Paul. 1 Includes pontoons. 2 Winter repairs to dredge, winter 1915-16.	Remarks. The dredge was employed during June in the construction of gravel dams at Gardners Island. It was found impracticable to compute the yardage of the dredge while engaged on this work, as the displacement and fill were both too irregular. The dredge was also used on snagging operations during the latter part of August and first part of September. The cost of dam construction and snagging amounted to \$3,093.08, which amount is included in the total cost of operating the dredge for the year, but has been subtracted in computing the unit cost of dredging. 1 405 tons or barrels, at \$2.79. 2 Labor cost of work done by crew in operating. Main dredging pump, \$2,006.36; pipe line,

\$1,230.81; barges (includes cost-
ing dredge), \$836.54.

* Represents yardage, place
measurement, within theoret-
ical section.
* Represents total yardage re-
moved by the dredge.
2.34 3/4 short tons or barrels,
at \$2.11.
19.5 short tons, at \$2.11.
375,600 gallons, at \$0.24.
12 ton, at \$110 to \$35.
422.7 short tons, at \$2.11
(average).
11.5 short tons, at \$2.11 (aver-
age).
60,400 gallons, at \$0.24.
13 Pascagoula Harbor, Miss.,
5.3 feet; Gulfport Harbor, Miss.,
5.4 feet; Wolf and Indian Rivers,
Miss., 4.7 feet; Biloxi Harbor,
Miss., 4.1 feet.
24 sleeves purchased were
worn out in a total of 26,842.5
hours, an average of 1,118.4 hours
per sleeve; 3 sleeves previously
purchased were worn out in
storm in a total of 2,272.9 hours,
an average of 757.6 hours per
sleeve. Of the 50 sleeves pur-
chased and 17 received from
dredge Gulfport during the year,
13 were transferred to the dredge
Wahalak. 8 were worn out by
storms after a total of 1,024 hours,
an average of 128 hours per
sleeve; 10 sleeves worn out after a
total of 4,084 hours, an average
of 408.4 hours per sleeve; 30
sleeves have been used a total of
22,901.5 hours and are still in
service; 6 sleeves are new and
have not been placed in service.
197. The total cost includes
\$7,947.07 for storm damage due
to hurricane of July 5, 1916
14 Item 72 - Item 72 + 73 a and
b) + Item 96 - Items (93 + 94) +
Item 53.

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Portland.	Rem.	Sacramento.	San Bernard.
1. District.....	Louisville, Ky.	Fourth Mississippi River.	Third San Francisco, Cal.	Galveston, Tex.
2. When built.....	1914.	1883; new steel hull, 1900.	1913.	1906.
3. Where built.....	Jeffersonville, Ind.	Jeffersonville, Ind.	Baltimore, Md., and Pittsburg, Cal.	Galveston, Tex.
4. Builder.....	Ed J. Howard.	Buoyus Steam Shovel & Dredge Co.	Ellicott Machine Co.	Bowers Southern Dredging Co.
5. Time to build.....	2 months.	8 months.	13 months.	4 months.
6. Material of hull.....	Steel.	Steel.	Steel.	Wood.
7. Contract cost of dredge.....	\$5,825 (hull).	\$90,500; steel hull, \$14,650.	\$176,800.	\$29,500.
8. (a) Cost of outfit; (b) cost of pipe line.	(a) \$12,331.95.	(a) Covered by contract; (b) covered by contract.	(a) \$45,326.66; (b) \$12,500.	
9. Length.....	100 feet.	125 feet.	150 feet.	83 feet.
10. Beam.....	27 feet.	30 feet.	40 feet.	32 feet.
11. Depth.....	5 feet.	7 feet 6 inches.	11 feet 6 inches.	7 feet 6 inches.
12. Draft:				
(a) Forward.....	2 feet 6 inches.	3 feet 6 inches.	6 feet 6 inches.	5 feet 6 inches.
(b) Aft.....	3 feet 2 inches.	4 feet 2 inches.	7 feet 6 inches.	4 feet 6 inches.
13. Displacement (long tons).....	131.	419.	984 (at 7-foot draft).	440.
14. Number of crew.....	10.	26.	42.	40.
15. Number, size, and type of propelling engines.....	None.	16 by 64 inch, noncondensing.	None.	None.
16. Number, size, and type of pumping engines.....	One 16 by 22 inch, horizontal single-cylinder.	14 by 28 by 20 inch compound condensing.	One 14 by 22½ inch and 40 by 36 inch vertical triple-expansion.	One 18 by 11½ inch, double-cylinder.
17. Cutter engines:				
(a) Diameter of cylinders.....	None.	8 inches.	11 inches.	8 inches.
(b) Stroke.....	None.	8 inches.	14 inches.	10 inches.
18. Hauling engines:				
(a) Diameter of cylinders.....	7½ inches.	10 inches.	36 inches.	6 inches.
(b) Stroke.....	10 inches.	14 inches.	12 inches.	10 inches.
19. Boilers:				
(a) Number and type.....	2 Scotch marine.	2 gunboat.	4 Scotch marine.	1 Scotch marine.
(b) Length.....	10 feet 1 inch.	17 feet 1 inch.	11 feet 4 inches.	11 feet.
(c) Diameter.....	6 feet 6 inches.	5 feet.	10 feet 6 inches.	10 feet 6 inches.
(d) Heating surface (total).....	600 square feet.	1,000 square feet.	4,762 square feet.	1,273 square feet.
(e) Grate surface (total).....	17½ square feet.	31 square feet.	150.3 square feet (oil used for fuel).	88 square feet.
20. Discharge pipe in use (average number of feet).....	76.	76.	2,763.	200.
21. Diameter of discharge pipe.....	12 inches.	16 inches.	20 inches.	15 inches.
22. Pontoons:				
(a) Number and material of those in use (average).....	None in use.	4 wood.	20 wood.	6 wood.
(b) Dimensions.....		18 by 5 by 3 feet.	36 by 10 feet by 2 feet 6 inches.	20 by 8 by 6 feet.

ATTENDANT PLANT.			Name.	
23. Revolutions per minute of propelling engines.	180.	18.	No propelling engines.	76.
24. Revolutions per minute of pumping engines.		17.		
25. Type of agitator or cutter head.		Ellicott.	Ellicott spiral.	Open rotary.
26. Diameter of cutter.		4 feet 4 inches.	6 feet 7 inches.	4 feet 6 inches.
27. Diameter of cutter shaft.		5 inches.	7 inches.	4 inches.
28. Type of suction head.		Opening behind cutter head.	Ellicott.	Open.
29. Revolutions per minute of cutter head.		125 pounds.	19.	19.
30. Average boiler pressure (gauge).		140 pounds.	186 pounds.	95 pounds.
31. Kind of coal used.		Pittsburgh, run of mine.	Fuel oil.	Crude oil.
32. Average gauge pressure in discharge pipe.		15 pounds.	35.1 pounds.	2.5 pounds.
33. Average vacuum in suction pipe.		25 inches.	15.4 inches.	11 inches.
Tugboat.				
34. Name of tug attached to dredge.	None.	None.	Rio Vista 1.	
35. Number of crew.			2.	
36. Displacement.			45.5 tons.	
37. Draft:				
(a) Forward.			4 feet.	
(b) Aft.			5 feet 4 inches.	
Launches.				
38. Name.	None.	None.	Denver 1.	
39. Length.			30 feet.	49 feet 6 inches.
40. Beam.			8 feet.	11 feet 6 inches.
41. Depth.			4 feet.	4 feet 6 inches.
42. Draft.			3 feet.	3 feet 6 inches.
43. Displacement.			3 tons (approximate).	16 tons.
Barges.				
44. Identifying numbers of barges in use.	Nos. 22, 23, 24, 25, 26, 27, 28, and 29.	No. 19.	2 (unnumbered).	2.
45. Usage.	Towing gravel for concrete.	Fuel.	Carrying fuel and general usage.	Oil and water.
46. Displacement, light (each).	78 tons.	98 tons.	Fuel barge 80 tons; barge for general usage 90 tons.	60 (both).
47. Capacity of barges (each).	305 tons.	400 tons.	Fuel barge 900 barrels; barge for general usage 150 tons.	150 (both).

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.	Portland.			Ram.			Sacramento.			San Bernard.		
	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Inland water-way.	Canseway.	
WORK PERFORMED.												
48. Location of dredging.												
49. Average depth before dredging, feet.												
50. Average depth after dredging, feet.												
51. Character of material dredged.												
52. Rate of advance per hour (in feet straight ahead).												
53. Amount dredged during the year.												
54. Total amount dredged by this dredge at this locality.												
55. Average amount dredged:												
(a) Per hour (pumping).												
(b) Per day.												
56. Maximum amount dredged in 1 month.												
57. Total number of days upon which any dredging was done.												
58. Average number of working hours per working day.												
59. Maximum number of working hours per working day.												
60. Time at work:												
(a) Pumping.												
(b) Handling pipe line.												
(c) Handling swinging wires (cleaning suction).												
(d) Going to and from wharf or anchorage.												
(e) Placing dredge.												
(f) Waiting for vessels to pass.												
61. Time lost from work:												
(a) Bad weather.												
(b) Changing location of plant.												
(c) Washing boilers and ordinary repairs.												
(d) Extraordinary repairs.												
(e) Other causes.												
62. Sundays and holidays.												
63. Total hours in year.												
64. Total time at work.												
Total time lost from work.												

COST OF WORK.		25 inches. Lined.			50 inches. Lined.			96 inches. Unlined.			Total cost.		
Dredge.		Number purchased.	Number pumping hours used.	Total cost.	Number purchased.	Number pumping hours used.	Total cost.	Number purchased.	Number pumping hours used.	Total cost.	Number purchased.	Number pumping hours used.	Total cost.
65. Pay rolls.....	\$3,083.17												\$23,999.33
66. Fuel for boilers.....	4,507.50												112,167.31
67. Coal for galley.....	14.50												435.00
68. Water.....													434.30
69. Supplies, subsistence.....													6,176.94
70. Supplies, engine room.....	54.90												1,744.05
71. Other supplies.....	12.70												4,116.52
72. Renewals or additions to outfit.....													
73. Ordinary repairs:													
(a) Hull.....	95.80												153.36
(b) Machinery (exclusive of main dredging pump).....	849.39												4,978.46
74. Laundry, ice, miscellaneous expenses.....	45.61												3,520.32
75. Total.....	\$4,618.57			\$10,894.48			\$86,841.03						\$52,606.59
Main dredging pump.													
76. Diameter of runner.....													
77. Volute (lined or unlined).....													
78. Renewals:													
(a) Volute.....							\$918.52						
(b) Runner.....													
(c) Volute liners.....							111.00						
(d) Runner liners.....							253.53						
(e) Head and back liners.....							397.22						
79. Miscellaneous repairs.....													
80. Total.....							1,680.27						
Pipe line.													
81. Renewals:													
(a) Rubber sleeves.....							1,891.30						\$1,250.58
(b) Pipe, feet.....							4,314.50						1,186.02
(c) Pontoon.....							1,638.86						1,183.75
(d) Outfit.....													135.48
82. Repairs.....							249.38						21.06
83. Miscellaneous.....							1,680.79						23.56
84. Total.....							10,054.83						3,822.45

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Portland.	Ram.	Sacramento.	San Bernardino.
COST OF WORK—continued.				
<i>Towboats and barges.</i>				
85. Pay rolls.....	\$1,243.70	\$2,244.17
86. Fuel for boilers.....	*1,121.71	1,956.82
87. Coal for galley.....
88. Water.....
89. Supplies, subsistence.....	227.78	610.77
90. Supplies, engine room.....	110.78	132.86
91. Launch supplies.....	17.18	167.88
92. Other supplies.....	17.45	157.06
93. Renewals of or additions to outfit.....	68.10	231.42
94. Ordinary repairs.....	54.07	256.55
95. Laundry, ice, miscellaneous expenses, etc.....	*230.86	1,796.89
96. Total.....	\$3,091.39	\$8,283.96
<i>Barges (amounts chargeable to dredges).</i>				
97. Ordinary repairs to barges.....	365.00
98. Miscellaneous expenses.....	*503.25	324.49
99. Total.....	503.25	689.49
100. Total field cost.....	\$4,618.57	\$10,894.48	102,170.75	65,373.09
101. Total field cost per cubic yard (cents).....	28.3	2,257.4	4.7289	4.7289
<i>Extra expenses.</i>				
102. Office expenses, superintendence, surveys, etc.....	550.00	7,611.12	1,625.26
103. Extraordinary repairs to dredges:
(a) Hull.....	1,288.72	.....
(b) Machinery (exclusive of main dredging pump).....	2,410.94	.....
104. Extraordinary repairs to towboats and launches.....	51.13	75.73
105. Extraordinary repairs to barges.....	550.00	.....	.....
106. Total.....	4,618.57	11,444.48	11,802.91	1,001.44
107. Gross cost per cubic yard (cents).....	28.3	11.4	113,480.66	60,974.1
108. Total.....	28.3	11.4	2,807.28	4,944.8

MISCELLANEOUS.

		7.26	2.517	2.06
107. Number of pounds of fuel per yard of material.				9,012 barrels.
108. Fuel consumed by dredge, tons or barrels.		305 tons		
109. Fuel consumed by auxiliary plant, tons or barrels.				
110. Cost of fuel.		\$4.25 per ton.		\$12,167.31.
111. Water purchased				288,000.
112. Cost of water per 1,000 gallons.				12 cents per 1,000.
113. Cost per cubic yard per hour at work.				
114. Linear feet of pipe line built during year and cost per linear foot.		\$13.20		
115. Linear feet of embankment built during year and cost per linear foot.				
116. Area in square feet cut over by dredge during year.				
117. Average increase of depth of channel cut over.				
		157,730	6,404,400	11,847,318.
		11 feet 9 inches		Inland waterway, 3 feet; causeway, 7 feet.
	Remarks.	Remarks.	Remarks.	Remarks.
1 House and outfit installed by the United States.	New dredging pump purchased last year and installed this year.	1 Used also by dredge San Joaquin.		1 9,012 barrels, at \$1.35.
2 Crew quartered on quarter boat No. 4.	The Ram was borrowed from this office and dredged the channel into Wolf River at Memphis, Tenn. A large portion of the time reported as "lost" was used at Memphis.	2 35,132.22 barrels, at 85.4 cents.		2 24 tons, at \$18.
3 Dredge rigged as sand and gravel digger. It was employed intermittently during the year in dredging sand for use in concrete and in pumping out conduits, etc.		3 189,738 gallons, at 7.58 cents.		3 288,000 gallons, at 12 cents per thousand.
4 1 1/2 tons, at \$2.90.		4 14,801.36 gallons at 7.58 cents.		4 Includes Fort Point charges of \$365.46. Dredge worked on inland waterway on coast of Texas and also removed 113,763 cubic yards in digging a trench for the city of Galveston to lay a water-main near the causeway.
5 3 tons, at \$2.90.		5 Rental for leased launches.		
6 Fuel was purchased by the bushel of 2,058 cubic inches.		6 Rental for leased barges.		
		7 Items 75—(72+73a)+73b)+96—(93+94)+(68X59a).		

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	San Jacinto.	San Joaquin.	San Pedro.	Sarasota.
1. District.....	Galveston, Tex.....	Third San Francisco, Cal.....	Los Angeles, Cal.....	Jacksonville, Fla. 1915.
2. When built.....	1915.....	1913.....	1904.....	Tampa, Fla.
3. Where built.....	Galveston, Tex.....	Baltimore, Md., and Pittsburg, Cal.	Hull at Los Angeles; machinery at Baltimore, Md.	Tampa Foundry & Machine Co.
4. Builder.....	Bowers Southern Dredging Co. Wood.	Ellicott Machine Co. 13 months.	Ellicott Machine Co. 15 months.	6 months.
5. Time to build.....	1 year.....	Steel.....	Wood.....	Steel.
6. Material cost of dredge.....	\$159,972.50.....	\$176,800.....	\$98,400.....	\$22,712.25. ¹
7. Contract cost of dredge.....	148 feet.....	(a) \$45,326.65; (b) \$12,500.....	(a) \$9,690; (b) \$22,200.....	(a) \$4,971.48; (b) \$2,509.56.
8. (a) Cost of outfit. (b) Cost of pipe line.....	38 feet.....	150 feet.....	140 feet 8 inches.....	77 feet 11 inches.
9. Length.....	12 feet.....	11 feet 6 inches.....	40 feet 8 inches.....	29 feet of inches.
10. Beam.....	5 feet 9 inches.....	6 feet 8 inches.....	5 feet 6 inches.....	5 feet.
11. Depth.....	6 feet 9 inches.....	7 feet 5 inches.....	5 feet 6 inches.....	2 feet 10 inches.
12. Draft:	961 tons.....	984 (at 7-foot draft).....	834.....	3 feet 4 inches.
(a) Forward.....	51.....	42.....	34.....	11.
(b) Aft.....	None.....	None.....	None.....	None.
13. Displacement (long tons).....	One 14 by 22½ by 40 by 20-inch vertical triple expansion.	One 14 by 22½ by 40 by 20-inch vertical triple expansion.	One 12 by 20 by 33 by 20-inch triple expansion, marine type.	One 8 by 14 by 10-inch Morri. compound.
14. Number of crew.....	12 inches.....	11 inches.....	Two 10 inches.....	6½ inches.
15. Number, size, and type of propelling engines.....	14 inches.....	8½ inches.....	Two 7 inches.....	8 inches.
(a) Diameter of cylinders.....	10 inches.....	12 inches.....	7 inches.....	6 inches.
(b) Stroke.....	2 Babcock & Wilcox water-tube. 13 feet 8 inches.....	4 Scotch marine.....	2 Babcock & Wilcox semimarine. Drums, 96 inches.....	8 inches.
16. Number and type.....	280 square feet.....	11 feet 4 inches.....	Drums, 42 inches.....	1 Clyde, dry back. 12 feet.
(a) Length.....	4,200 square feet.....	10 feet 6 inches.....	4,000 square feet.....	7 feet 6 inches.
(b) Diameter.....	None; oil burner.....	150.8 square feet (oil used for fuel) 2,992.....	88 square feet.....	1,180 square feet.
(c) Heating surface (total).....	1,300.....	20 inches.....	150.8 square feet.....	21 square feet.
(d) Grate surface (total).....	20 inches.....	16 wood.....	1,947.....	200.
(e) Discharge pipe in use (average num- ber of feet).....	3 pairs steel.....	36 by 10 feet by 2 feet 6 inches.....	20 inches.....	10 inches.
20. Diameter of discharge pipe.....	46 diameter, 25 feet long.....	None.....	41 wood.....	12 wood (cypress).
21. Pontoon:	None.....	No propelling engines.....	21 feet 3 inches by 10 feet by 3 feet; 36 by 10 feet by 3 inches. None.....	14 by 6 by 2 feet.
(a) Number and material of those in use (average).....	150.....	176.....	180 to 180.....	None.
(b) Dimensions.....				360.
22. Revolutions per minute of propelling engines.....				
24. Revolutions per minute of pumping engines.....				

25. Type of agitator or cutter head.	Open rotary.	Elliptic spiral.	Rotary.	Revolving tooth.
26. Diameter of cutter.	6 feet 4 inches.	6 feet 7 inches.	6 feet.	3 feet.
27. Diameter of cutter shaft.	8 inches.	7 inches.	7 inches.	4 inches.
28. Type of cutter.	Open.	Elliptic.	Elliptic.	Square with hood.
29. Revolutions per minute of cutter head.	12 to 14.	16.	12.	24.
30. Average boiler pressure (gauge).	200 pounds.	185 pounds.	200 pounds.	103 pounds.
31. Kind of coal used.	Crude oil.	Fuel oil.	Fuel oil.	Wood.
32. Average gauge pressure in discharge pipe.	30 pounds.	39.1 pounds.	25 pounds.	11.5 pounds.
33. Average vacuum in suction pipe.	15 inches.	15.3 inches.	16 inches.	8 inches.

ATTENDANT PLANT.			
<i>Towboat.</i>			
34. Name of tug attached to dredge.	Captain Talfor.	Rio Vista 1.	None.
35. Number of crew.	7.	2.	Do.
36. Displacement.	43 tons.	45.5 tons.	Do.
37. Draft:			
(a) Forward.	7 feet.	4 feet.	
(b) Aft.	8 feet.	5 feet 4 inches.	
<i>Lawnscha.</i>			
38. Name.	Copano.	Denver 1.	Cerritos.
39. Length.	28 feet 6 inches.	30 feet.	35 feet 6 inches.
40. Beam.	7 feet.	8 feet.	9 feet 6 inches.
41. Depth.	2 feet 8 inches.	4½ feet.	4 feet 6 inches.
42. Draft.	2 feet 2 inches.	3 feet.	3 feet.
43. Displacement.	2 tons.	3 tons (approximate).	2 feet.
			7.32 tons.
			0.65 ton.

<i>Barges.</i>						
44. Identifying numbers of barges in use.	One, No. 9.	2 (unnumbered).	5.	U. S. B. 1.	U. S. B. 2.	H. B. 1.
45. Usage.	Oil and water.	Carrying fuel and general usage; fuel barge, 80 tons; barge for general usage.	Fuel, water, and work.	Fuel.	Fuel.	Quarter boat.
46. Displacement, light (each).		90 tons.	9 tons.	30	30	30
47. Capacity of barges (each).	250.	Fuel barge, 900 barrels; barge for general usage, 150 tons.	38.8 tons.	50	50	50

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	San Jacinto.		San Joaquin.	San Pedro.	Sarasota.			
	Houston ship channel.	Turning basin in city of Houston.	Sacramento River between Colinsville and Rio Vista.	(1)	Boca Ciega Bay.	Clearwater Harbor.	Manatee River.	Sarasota Bay, Fla.
48. Location of dredging.....	20 feet.....	11 feet.....	1.8 feet.....	(1)	4.6 feet.....	4.6 feet.....	3.1 feet.....	4 feet.....
49. Average depth before dredging, feet.....	23 feet.....	30 feet.....	21.5 feet.....	(1)	6 feet.....	6 feet.....	4.8 feet.....	5 feet.....
50. Average depth after dredging, feet.....	Mud, 40 per cent; sand, 20 per cent; silt, 40 per cent.	Clay, 40 per cent; sand, 50 per cent; silt, 10 per cent.	14 per cent clay, 30 per cent sand, and 56 per cent peat.	(1)	Sand 92 per cent.	Clay, 3 per cent.	Shell, 4 per cent.	Mud, 1 per cent.
51. Character of material dredged.....								
52. Rate of advance per hour (in feet straight ahead).....	9 feet.....	2 feet.....	4.2 feet.....	(1)	21.9 feet.....			
53. Amount dredged during the year.....	2,550,723 cubic yards.		3,964,611 cubic yards.....	(1)	61,034 cubic yards.....			
54. Total amount dredged by this dredge at this locality.....	2,419,651 cubic yards.	131,072 cubic yards.	9,856,956 cubic yards.....	9,828,906 cubic yards.....				
55. Average amount dredged: (a) Per hour (pumping).....	664 cubic yards.....		809 cubic yards.....	(1)	91.8 cubic yards.....			
(b) Per day.....	10,570 cubic yards.....		14,904 cubic yards.....	(1)	462.4 cubic yards.....			
56. Maximum amount dredged in 1 month.....	804,074 cubic yards.....		568,133 cubic yards.....	(1)	11,280 cubic yards.....			
57. Total number of days upon which any dredging was done.....	246.....		266.....	(1)	132.....			
58. Average number of working hours per working day.....	12 hours 14 minutes.....		18 hours 17 minutes.....	(1)	5 hours 52 minutes.....			
59. Maximum number of working hours per working day.....	22 hours 30 minutes.....		23 hours 26 minutes.....	(1)	8 hours.....			

DISTRIBUTION OF TIME.									
Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Percentage.
60. Time at work:									
(a) Pumping.....	3, 541	43.80	4, 573	30	55.54	671	55	7.864	
(b) Handling pipe line.....	725	8.26	530		5.92	70	30	.862	
(c) Handling (sawing wires) cleaning suction.....	263	2.87	511	25	5.81	15	25	.172	
(d) Going to and from wharf or anchorage.....									
(e) Placing dredge.....			10	20	12	15	10	.170	
(f) Waiting for vessels to pass.....			1	40	.02	1	30	.010	
61. Time lost from work:	263	3.03	55	20	.04	81		.933	
(a) Changing location of plant.....			14	30	.17				
(b) Bad weather.....									
(c) Washing boilers and ordinary repairs.....	410	4.67				15	50	.181	
(d) Extraordinary repairs.....	94	1.07	1, 125	30	12.82	438	45	5.038	
(e) Other causes.....	1, 708	19.43	225	45	2.57	6, 035	55	* 68.494	
(f) Sundays and holidays.....	1, 488	17.03	1, 440		16.39	1, 440		16.391	
62. Total hours in year.....	8, 794	100.00	8, 794		100.00	8, 794		100.000	
63. Total time at work.....	4, 818	54.60	5, 021	55	67.41	774	30	8.818	
64. Total time lost from work.....	3, 965	45.40	2, 862	5	32.59		30	91.182	
COST OF WORK.									
Dredge.									
65. Pay rolls.....	\$44, 621.83			\$41, 854.76			\$2, 866.00		\$24, 355.09
66. Fuel for boilers.....	131, 983.15			27, 062.77					517.55
67. Coal for galley.....	147.62								
68. Water.....	12, 322.11			* 12.92					
69. Supplies, substance room.....	1, 635.82			10, 007.94					867.58
70. Supplies, engine room.....	2, 752.31			1, 238.35					225.79
71. Other supplies.....	5, 687.17			1, 268.42					5.45
72. Renewals or additions to outfit.....				2, 533.35					998.41
73. Ordinary repairs:									
(a) Hull.....	100.01			703.03					
(b) Machinery (exclusive of main dredging pump).....	2, 867.34								25.36
74. Laundry, ice, miscellaneous expenses.....	* 12, 913.03			354.05					94.62
75. Total.....	\$115, 390.39			\$85, 375.64					\$3, 109.85

Towboats and launches.				Towboats and launches.				Towboats and launches.				Towboats and launches.			
86. Pay rolls.....	2, 139. 53	1, 945. 69	(1)	203. 00				86. Total.....	5, 792. 23	3, 100. 30	.....	722. 33			
86a. Fuel for boilers.....		1, 125. 55		315. 65				Barges (amounts chargeable to dredge).							
87. Coal for galley.....								97. Ordinary repairs to barges.....							
88. Water.....								98. Miscellaneous expenses.....	10. 00	505. 28	.....			
89. Supplies, subsistence.....		222. 72						99. Total field cost.....							
90. Supplies, engine room.....		109. 57						Total field cost.....							
91. Launch supplies.....		17. 17						Total field cost per cubic yard (cents).....	5.311	135, 475. 45	(1)	15. 241.			
92. Other supplies.....	3, 652. 81	17. 13						Boat expenses.							
93. Renewals of or additions to outfit.....		55. 69						101. Office expenses, superintendence, surveys, etc.....	5, 595. 22	7, 099. 10		62. 50			
94. Ordinary repairs.....		54. 04						102. Extraordinary repairs to dredges:							
95. Laundry, ice, miscellaneous expenses, etc.....		4250. 85						(a) Hull.....	1, 244. 30	905. 37				12, 618. 25	
								(b) Machinery (exclusive of main dredging pump).....	3, 522. 90	2, 394. 47				633. 99	
								103. Extraordinary repairs to towboats and launches.....		124. 52				69. 82	
								104. Extraordinary repairs to barges.....							

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	San Jacinto.	San Joaquin.	San Pedro.	Sarasota.
MISCELLANEOUS.				
107. Number of pounds of fuel per yard of material.....	4.24 pounds.....	2,702.....	(1).....	1,594 cords wood.
108. Fuel consumed by dredge, tons or barrels.....	33,666 barrels.....	32,555.14 barrels fuel oil.....	(1).....	1,559 gallons gasoline.
109. Fuel consumed by auxiliary plant, tons or barrels.....		14,846.96 gallons distillate.....	(1).....	Wood, \$3.25 per cord; gas, 20.34 cents per gallon.
110. Cost of fuel.....	\$31,983.15.....	Fuel oil, 83.2 cents per barrel; distillate, 7.8987 cents gallon.....	(1).....	None.
111. Water purchased.....		71,792 gallons.....	(1).....	Nothing.
112. Cost of water per 1,000 gallons.....		18 cents.....	(1).....	\$0.113.
113. Cost per cubic yard per hour at work.....		1.77 cents.....	(1).....	None.
114. Linear feet of pipe line built during year and cost per linear foot.....		32,000 feet; cost indeterminate.....	(1).....	Do.
115. Linear feet of embankment built during year and cost per linear foot.....		None.....	(1).....	1,184,355.
116. Area in square feet cut over by dredge during year.....	8,332,552.....	4,969,640.....	(1).....	1.4 feet.
117. Average increase of depth of channel cut over.....	Houston ship channel, 8 feet; turning basin, city of Houston, 19 feet. Remarks. 1 33,666 barrels, at 95 cents. 2 35 tons, at \$13. 3 Includes Fort Point depot charges of \$9,266.11.	Remarks. 1 Used also by dredge Sacramento. 2 32,555.14 barrels, at 83.2 cents. 3 71,792 gallons, at 18 cents. 4 Rental for leased launches. 5 Rental for leased barges. 6 Items 75—(72 + 78 + 73b) + 96—(93 + 94) + (63 × 55a).	Remarks. 1 Out of commission entire year. Pay rolls include pay of men for making minor repairs and watching dredging plant.	Remarks. 1 During the year quarters were constructed at a cost of \$2,618.25. 2 Removing 972 snags. 3 10 men. 4 1594 cords of wood, at \$3.25. 5 Of 19 sleeves in service, 5 were out in 927 hours pumping, 11 are in good condition after an average of 1,320 hours, and 3 are in good condition after 1,604 hours pumping. 6 200 feet at 88 cents per linear foot, 200 linear feet at \$1. 7 1 man, at \$4.8. 8 1,559 gallons gasoline for engine, at 20.34 cents.

Name.....	Seine.	Shippingport.	Tied.	H. S. Taker.
1. District.....	St. Louis, Mo.	Louisville, Ky.	Rock Island, Ill.	Little Rock, Ark.
2. When built.....	1897-98.	1914.	1911-12.	1918-1914.
3. Where built.....	Jeffersonville, Ind.	Jeffersonville, Ind.	Keokuk, Iowa.	Des Moines, Iowa.
4. Builder.....	The Bucyrus Co.	Ed. J. Howard.	United States.	Dubuque Post & Boiler Work &
5. Time to build.....	10 months.	2 months.	About 1 year.	2 1/2 years 2 months.
6. Material of hull.....	Steel.	Steel.	Wood, steel, and concrete.	Steel.
7. Contract cost of dredge.....	\$102,400.	\$5,325 (hull).	\$39,178.45.	\$300,104.24.
8. (a) Cost of outfit: (b) Cost of pipe line.....	(a) \$14,751.06; (b) not known.	(a) \$13,330.78; (b) \$1,346.78.	(a) Included in above: (b) \$7,333.81.	(a) \$4,472.92; (b) \$22,847.13.
9. Length.....	100 feet.	100 feet.	180 feet.	200 feet 9 inches over all.
10. Beam.....	40 feet.	22 feet 8 inches.	28 feet.	44 feet 4 inches.
11. Depth.....	6 feet.	5 feet.	5 feet.	7 feet.
12. Draft.....	4 feet.	1 foot 7 inches.	2 feet 9 inches.	3 feet 7 inches.
13. Displacement (long tons).....	4 feet.	3 feet 3 inches.	2 feet 11 1/2 inches.	3 feet 4 inches.
14. Number of crew.....	600.	131.	267.	754.
15. Number, size, and type of propelling engines.....	33.	None.	19.	42.
16. Number, size, and type of pumping engines.....	None.	One 16 by 22 inch horizontal single cylinder.	No propelling engines.	Two 24 by 48 inch stroke: Gillette & Eaton.
17. Cutter engines:	Two 15 by 20 by 18 inch horizontal noncondensing cross compound, direct-connected.	One 16 by 22 inch horizontal single cylinder.	One 13 by 25 by 16 inch cross compound, condensing.	One 15 by 27 by 36 by 18 inch, condensing.
(a) Diameter of cylinders.....	None.	44 by 6 inches.	No cutter engines.	No cutter engines.
(b) Stroke.....	None.	6 inches.	84 inches.	7 inches.
18. Hauling engines:	7 inches.	74 inches.	10 inches.	8 inches.
(a) Diameter of cylinders.....	do.	10 inches.	10 inches.	10 inches.
(b) Stroke.....	do.	10 inches.	10 inches.	10 inches.
19. Bolters:	6 Mississippi River.	2 Scotch marine.	3 Mississippi River type.	3 Lyons combination water and fire tube.
(a) Number and type.....	28 feet.	10 feet 1 inch.	20 feet 21 inches.	20 feet.
(b) Length.....	48 inches; 5 flues 11 inches diameter.	6 feet 6 inches.	40 1/2 inches.	60 inches.
(c) Diameter.....	3,925 square feet.	600 square feet.	1,106 square feet.	5,184 square feet.
(d) Heating surface (total).....	112 square feet.	174 square feet.	48.75 square feet.	1,355 square feet.
20. Discharge pipe in use (average number of feet).....	300.	200.	630.	250.
21. Diameter of discharge pipe.....	28 inches.	12 inches.	18 inches.	24 inches.
22. Pontoons:	9 steel.	7 wood (Georgia pine).	21 composite.	5 steel.
(a) Number and material of those in use (average).....	Lozenge shape, 20 by 14 by 2 1/2 feet.	5 by 20 by 4 feet deep.	50 by 14 feet by 3 feet 4 inches.	47 feet 6 inches by 12 by 3 feet.
(b) Dimensions.....			No propelling engines.	14 (as operated).
23. Revolutions per minute of propelling engines.....				
24. Revolutions per minute of pumping engines.....	135.	150.	222.	102.

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Selma.	Shippingport.	Tual.	H. S. Tuber.
25. Type of agitator or cutter head.....	Water-jet sand agitator.....		No cutter head.....	Water jet; no cutter head.
26. Diameter of cutter.....		3 feet 4 inches.....	No cutter head.....	No cutter head.
27. Diameter of cutter shaft.....		3½ inches.....		Do.
28. Type of suction head.....	Dustpan.....		Plain square.....	Dustpan.
29. Revolutions per minute of cutter head.....		5.....		No cutter head.
30. Average boiler pressure (gauge).....	126 pounds.....	126 pounds.....	145 pounds.....	160 pounds.
31. Kind of coal used.....	Bituminous.....	Pittsburgh, run of mine.....	Bituminous lump.....	Mine run; semianthracite.
32. Average gauge pressure in discharge pipe.....	4 pounds.....	5 pounds.....	19 pounds per square inch.....	5 pounds.
33. Average vacuum in suction pipe.....	14 pounds.....	20 inches.....	22 inches of mercury.....	16 inches.
ATTENDANT PLANT.				
Towboat.				
34. Name of tug attached to dredge.....	Aux Vases.....	None.....	None regularly.....	J. C. Atlee (chartered plant). ¹
35. Number of crew.....	4.....			6.
36. Displacement.....	50.....			Not known.
37. Draft.....				
(a) Forward.....	3 feet 6 inches.....			Do.
(b) Aft.....	do.....			Do.
Launches.				
38. Name.....		None.....	None.....	None.
39. Length.....				
40. Beam.....				
41. Depth.....				
42. Draft.....				
43. Displacement.....				
Barges.				
44. Identifying numbers of barges in use.....		None.....	No. 487 and No. 486.....	B1, B2, B3, B4(?).
45. Usage.....	Coal.....		Fuel (coal), flats.....	Fuel supply.
46. Displacement, light (each).....	160.....		50 long tons each.....	70 long tons.
47. Capacity of barges (each).....	300.....		132 long tons each.....	180 long tons, maximum
WORK PERFORMED.				
48. Location of dredging.....	See Remarks.....		Mississippi River, Burlington, Iowa, to Missouri River.....	Arkansas River.
49. Average depth before dredging, feet.....	6.3.....		1.97 feet.....	5 feet.
50. Average depth after dredging, feet.....	9.3.....		9.19 feet.....	8.75 feet. ²
51. Character of material dredged.....	Sand, gravel, clay, small bowlders.....		Sand, 90 per cent; gravel, 10 per cent.....	Sand, 92 per cent; gravel, 2 per cent; mud, 6 per cent.
52. Rate of advance per hour (in feet straight ahead).....	141.....		14.23.....	166.
53. Amount dredged during the year.....	119,800 cubic yards.....		221,690 cubic yards.....	406,100 cubic yards.
54. Total amount dredged by this dredge at this locality.....	See Remarks.....			1,764,660 cubic yards.

55. Average amount dredged: (a) Per hour (pumping)..... (b) Per day..... 56. Maximum amount dredged in one month.....	600 cubic yards. 4,437 cubic yards.					419 cubic yards. 2,954.6 cubic yards. 74,514 cubic yards.	761 cubic yards. 2,037 cubic yards. 100,960 cubic yards.
57. Total number of days upon which any dredging was done. 58. Average number of working hours per working day. 59. Maximum number of working hours per working day.	27. 7.3 14.5					75. 14 hours, 48 minutes. 16.	79. 16. 16.
DISTRIBUTION OF TIME.							
60. Time at work:							
(a) Pumping.....	198	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.
(b) Pumping pipe line.....	45		2.0	(*)	329	6.02	632
(c) Handling swinging wires (cleaning suction).....	35		.5		254	2.89	130
(d) Going to and from wharf or anchorage.....			.4		64	.73	103
(e) Placing dredge.....	94				107	1.22	1
(f) Waiting for vessels to pass.....	16		1.0		36	.41	473
61. Time lost from work:					118	1.34	19
(a) Changing location of plant.....	102		1.0		242	2.74	492
(b) Bad weather.....	13				4	.04	19
(c) Washing boilers and ordinary repairs.....	104		2.0		8	.09	33
(d) Extraordinary repairs.....	7,913		90.9		12	.14	14
(e) Other causes.....	240		2.2		6,491	73.96	5,052
(f) Sundays and holidays.....					915	10.42	1,596
62. Total hours in year.....	8,784		100.00		8,784	100.00	8,784
63. Total time at work.....					1,119	12.61	1,378
64. Total time lost from work.....	1,190				7,673	87.39	7,406
COST OF WORK.							
Dredge.							
65. Pay rolls.....	\$6,828.35				\$5,025.64		\$15,251.94
66. Fuel for boilers.....	11,056.30				707.04		5,345.20
67. Cost for galley.....	\$11.30						6.78.68
68. Water.....							
69. Supplies, subsistence.....	1,774.65				1,130.49		5,535.73
70. Supplies, engine room.....	456.84				303.82		893.70
71. Other supplies.....	511.28				573.81		704.60
72. Renewals or additions to outfit.....					78.94		1,226.78
73. Ordinary repairs:							
(a) Hull.....	1,444.04				3.31		120.14
(b) Machinery (exclusive of main dredging pump).....	1,924.59						399.17
74. Laundry, ice, miscellaneous expenses.....	111.24				61.18		59.46
75. Total.....	\$14,116.59				\$8,576.22		\$29,611.40

TABLE V.—Performances of pipe-line hydraulic dredge for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Séma.				Shippingport.				Tual.				H. S. Teber.			
COST OF WORK—continued.																
Main dredging pump.																
76. Diameter of runner.....	72 inches Lined.....				25 inches Lined.....				50 inches Lined front and back only.....				69 inches Lined.....			
77. Volute (lined or unlined).....																
	Number purchased.....	Number pumping hours used.....	Total cost.....		Number purchased.....	Number pumping hours used.....	Total cost.....		Number purchased.....	Number pumping hours used.....	Total cost.....		Number purchased.....	Number pumping hours used.....	Total cost.....	
78. Renewals:																
(a) Volute.....																
(b) Runner.....																
(c) Volute liners.....							\$495.70									
(d) Runner liners.....																
(e) Head and back liners.....																
79. Miscellaneous repairs.....							192.54									\$36.20
80. Total.....							\$678.24									\$36.20
Pipe line.																
81. Renewals:																
(a) Rubber sleeves.....																
(b) Pipe.....									12		\$470.40					\$140.63
(c) Pontoon.....																
(d) Outfit.....																17.76
82. Repairs.....																19.00
83. Miscellaneous.....																
84. Total.....																\$470.40
Tonboats and launches.																
85. Pay rolls.....																
86. Fuel for boilers.....																330.00
87. Coal for galley.....																47.53
88. Water.....																* 16.00
																1,501.32
																* 16.00

89. Supplies, subsistence.....	102.66				84.84	
90. Supplies, engine room.....	6.00				10.00	
91. Launch supplies.....						
92. Other supplies.....	8.00					
93. Renewals of or additions to outfit.....						
94. Ordinary repairs.....	115.56					
95. Laundry, etc., miscellaneous expenses, etc.....	2.00				10.00	13,658.34
96. Total.....	1,070.01				482.00	4,172.26
<i>Barges (amounts chargeable to dredge).</i>						
97. Ordinary repairs to barges.....						*217.38
98. Miscellaneous expenses.....						36.62
99. Total field cost.....						254.00
100. Total field cost per cubic yard (cents).....	12.7	15,198.58		4.3	9,528.62	
<i>Extra expenses.</i>						
101. Office expenses, superintendence, survey, etc.....					\$561.75	\$4,970.45
102. Extraordinary repairs to dredge: (a) Hull.....						
(b) Machinery (exclusive of main dredging pump).....					*1,377.58	
103. Extraordinary repairs to towboats and launches.....						
104. Extraordinary repairs to barges.....						48.00
105. Total.....					1,939.33	5,027.45
106. Gross cost per cubic yard (cents).....	12.7	15,198.58	752.89	5.17	11,467.95	39,262.70
MISCELLANEOUS.						
107. Number of pounds of fuel per yard of material.....						2.8.
108. Fuel consumed by dredge, tons or barrels.....	503 tons			5.60	1,634 tons.	1,634 tons.
109. Fuel consumed by auxiliary plant, tons or barrels.....	78			12.6 long tons.	156 tons.	156 tons.
110. Cost of fuel.....	\$2.10 per ton.					\$5,942.80.
111. Water purchased.....						None.
112. Cost per cubic yard per month's work.....						None.
113. Cost per cubic yard per month's work.....						6.01 cents.
114. Linear feet of pipe line built during year.....						None built.
115. Linear feet of embankment built during year and cost per linear foot.....						Do.

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Scams.	Shippingport.	Tons.	H. S. Taber.
MISCELLANEOUS—continued.				
116. Area in square feet cut over by dredge during year.	1,116,000.....		828,600.....	1,920,450.
117. Average increase of depth of channel cut over.	3 feet.....		7.22 feet.....	3.75 feet. ²
	<p><i>Remarks.</i></p> <p>Mississippi River between mouths of Ohio and Missouri Rivers. Amount dredged. Perry Towhead. 41,900 cu. yds. Grand Tower... 49,500 Little Rock Incline..... 26,400 "</p> <p>119,800 1563.4 tons, at \$2.10. ± 5.38 tons, at \$2.10. ± 5 men. ± 78 tons.</p>	<p><i>Remarks.</i></p> <p>¹ House and outfit installed by the United States. ² Dredge not operated during the year.</p>	<p><i>Remarks.</i></p> <p>Dredge Tasi was in commission 98 days, 27 days making steamboat channel and 71 days dredging in channel for sand to fill the base of spur dams in the Mississippi River in vicinity of Ashburn, Mo. ¹ Includes pontoons. ² Winter repairs to dredge, winter 1915-16.</p>	<p><i>Remarks.</i></p> <p>Labor cost of work done by crew on operating main dredging pump, pipe line, and barges not separable. Fuel purchased by short ton of 2,000 pounds. ¹ Additional towing and survey service in connection with these operations were, snagboat Arkansas, 20 days; snagboat Quipaw, 21 days; snagboat C. B. Reese, 4 days; hired boat Miller, 15 days; and hired boat Wolferine, 16 days. The charter rate for the J. C. Alce included everything except fuel. The cost to the work of the other boats is included in item 95—one-half to dredge Robert McGregor and one-half to dredge H. S. Taber. ² These barges used interchangeable between dredges Robert McGregor and H. S. Taber and costs in connection therewith divided equally between the two dredges. Coal was also procured in coal company barges. ³ One day after dredging. ⁴ 1,010 tons of coal, at \$3.32. ⁵ 24 tons, at \$3.32. ⁶ 15 pipe line gaskets for spare stock; cost divided equally between dredges Robert McGregor and H. S. Taber. ⁷ 161 tons, at \$3.32. ⁸ 5 tons, at \$3.32. ⁹ Includes \$57.92 repairs to pilers.</p>

Name.....	Talbot, Captain Andrew.	Thos.	Verselius.	Wakelak.
1. District.....	First New York	St. Louis, Mo.	Rock Island, Ill.	Mobile, Ala.
2. When built.....	1912	1897-98	1908	1909
3. Where built.....	Washington, N. C.	Jeffersonville, Ind.	Fountain City, Wis.	Baltimore, Md.
4. Built by.....	Minor Engineering Co.	The Buerrus Co.	United States	Ellicott Machine Corporation.
5. Time to build.....	1 year	10 months	1 year	8 months
6. Material of hull.....	Wood	Steel	Wood	Steel
7. Contract cost of dredge.....	\$57,485	\$102,400	\$30,448.54	\$150,000; \$161,039.95
8. (a) Cost of outfit; (b) cost of pipe line.....	(a) \$7,000; (b) \$6,200	(a) \$12,74.95; (b) unknown	(a) Included in above; (b) \$3,024.32	(a) \$1,905.98; (b) \$18,732.25.
9. Length.....	111 feet 8 inches	180 feet	114 feet 10 inches	150 feet
10. Beam.....	32 feet	40 feet	30 feet	40 feet
11. Depth.....	9 feet 7 inches	6 feet	5 feet	11 feet 6 inches
12. Draft.....	6 feet 8 inches	4 feet	2 feet 6 inches	6 feet
13. Displacement (long tons).....	5 feet	4 feet	2 feet 8 inches	6 feet
14. Number of crew.....	46	600	214	884
15. Number, size, and type of propelling engines.....	38	52	19	42
16. Number, size, and type of pumping engines.....	None	None	No propelling engines	None
17. Cutter engines:	One 14 and 28 by 18 inch fore and aft compound	Two 15 and 26 by 18 inch horizontal, noncondensing cross-compound, direct-connected	One 12 and 24 by 14 inch cross-compound, condensing	One triple-expansion; 14, 22½ and 40 by 20
(a) Diameter of cylinders.....	10 inches	None	No cutter engines	11½ inches
(b) Stroke.....	do	7 inches	5 inches	14 inches
18. Hauling engines:	84 inches	do	7 inches	8½ inches
(a) Diameter of cylinders.....	10 inches	do	2½ inches	12 inches
(b) Stroke.....	14 inches	do	2½ inches	12 inches
19. Boilers:	(a) Number and type.....	6, Mississippi River	2, Benson	4, Scotch marine
(b) Length.....	19 feet	28 feet	10 feet	10 feet 6 inches
(c) Diameter.....	14 feet	48 inches; five 11-inch flues	60 inches	11 feet 4 inches
(d) Heating surface (total).....	4,722 square feet	3,925 square feet	2,415.76 square feet	4,732 square feet
(e) Grate surface (total).....	88 square feet	112 square feet	50.62 square feet	150.8 square feet
20. Discharge pipe in use (average number of feet).....	1,142	300 feet	600 feet	1,056
21. Diameter of discharge pipe.....	18 inches	28 inches	17 inches	20 inches
22. Pontoons:	(a) Number and material of those in use (average).....	9, steel	12, wood	58, steel
(b) Dimensions.....	18 by 8 by 3 feet 6 inches	Lozenge shape, 20 by 14 by 24 feet	49 by 12 feet by 2 feet 6 inches	28 by 4 by 4 feet
23. Revolutions per minute of propelling engines.....	None	None	No propelling engines	None
24. Revolutions per minute of pumping engines.....	240	140	284	146
25. Type of agitator or cutter head.....	Taylor-Wharton; spiral bladed	Water jet sand agitator	No cutter head	Ellicott spiral

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Tulcot, Captain Andrew.	Thebes.	Venustus.	Wahalak.
26. Diameter of cutter.....	5 feet.			6 feet 7 inches (over blades).
27. Diameter of cutter shaft.....	6 inches.			7 inches (increased to 8½ inches at cutter).
28. Type of suction head.....	Elliptical.	Dustpan.	Plain square.	Ellicott cast steel.
29. Revolutions per minute of cutter head.....	10.			12.
30. Average boiler pressure (gauge).....	150.	125 pounds.	140 pounds.	174 pounds.
31. Kind of coal used.....	Bituminous.	Bituminous.	Bituminous lump.	Bituminous.
32. Average gauge pressure in discharge pipe.....	30 pounds.	24 pounds.	13 pounds per square inch.	26 pounds.
33. Average vacuum in suction pipe.....	8 inches.	15 pounds.	1½ inches of mercury.	8 inches.
ATTENDANT PLANT.				
<i>Tugboat.</i>				
34. Name of tug attached to dredge.....	Colonel Thayer.	Aux Vases.	None regularly.	Horace Harding.
35. Number of crew.....	3.	4.		9.
36. Displacement.....	34.	50 tons.		215.
37. Draft:				
a. Forward.....	5 feet.	3 feet 6 inches.		6 feet 4 inches.
b. Aft.....	6 feet 5 inches.	do.		8 feet 2 inches.
<i>Launcher.</i>				
38. Name.....			None.	Retting.
39. Length.....				40 feet 9 inches.
40. Beam.....				12 feet 3 inches.
41. Depth.....				5 feet.
42. Draft.....				4 feet.
43. Displacement.....				25 tons.
<i>Barge.</i>				
44. Identifying numbers of barges in use.			No. 203 and No. 204.	E and K.
45. Usage.....		2. Fuel.	Fuel (coal) flats.	Coaly and water and shifting
46. Displacement, light (each).....		150 tons.	32 long tons each.	aground.
47. Capacity of barges (each).....		300 tons.	90 long tons each.	104 tons and 12 tons.
WORK PERFORMED.				
48. Location of dredging.....	Mattawan Creek, N. J., Wood-bridge Creek, N. J.	See Remarks.	Mississippi River, Winona to Wisconsin River.	Mobile Harbor and Pass Aux Herons.
49. Average depth before dredging.....	2 feet to 4 feet; 5 feet to 8 feet.	4 feet.	4.32 feet.	26 feet M.; 8.5 feet P. A. H.

50. Average depth after dredging.....	4 feet to 7 feet; 8 feet to 10 feet.....	9 feet.....	11.7 feet.....	30.3 feet M.; 11.8 feet P. A. H.
51. Character of material dredged.....	Sand and mud.....	Sand, gravel, small bowlders.....	Sand.....	Mud, sand, and shells.....
52. Rate of advance per hour (in feet straight ahead).....	71,940 cubic yards.....	88,400.....	127.....	43.4.....
53. Amount dredged during the year.....		See Remarks.....		
54. Total amount dredged by this dredge at this locality.....				2,293,650.8 cubic yards.*
55. Average amount dredged: (a) Per hour (pumping)..... (b) Per day..... (c) Per month.....				2,350,968 cubic yards.*
56. Maximum amount dredged in one month.....				
57. Total number of days upon which any dredging was done.....				1,927.9 cubic yards.
58. Average number of working hours per working day.....				27,634.3 cubic yards.
59. Maximum number of working hours per working day.....				774,641.6 cubic yards.
				82.....
				13.1.....
				24.....

DISTRIBUTION OF TIME.

	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
60. Time at work:									
(a) Pumping.....	128		1.4	705	45	8.03	1,254	48	14.29
(b) Handling pipe line.....	25		.3	114	5	1.30	60	16	.69
(c) Handling swinging wires (cleaning suction).....	12		.2	13	30	.15	184	33	2.10
(d) Going to and from wharf or anchorage.....				164	5	1.76			
(e) Placing dredge.....	66		.6	28		.32			
(f) Waiting for vessels to pass.....	4			17	20	.19	2	40	.08
61. Time lost from work:									
(a) Changing location of plant.....	48		.4	137	40	1.57	35	50	.41
(b) Bad weather.....	2			18	25	.21	247	15	2.81
(c) Washing boilers and ordinary repairs.....	37		.3	11	20	.12	3,111	10	35.43
(d) Extraordinary repairs.....				6	30	.07	23	40	.26
(e) Other causes.....	8,395		83.2	7,241	20	82.45	2,494	48	27.60
(f) Sundays and holidays.....	72		.6	336		3.83	1,440		16.39
62. Total hours in year.....	8,784		100.00	8,784		100.00	8,784		8.784
63. Total time at work.....	235		11.75	1,032	45	11.75	1,502	17	17.11
64. Total time lost from work.....				7,751	15	88.25	7,281	43	82.89

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Talbot, Captain Andrew.	Thos.	Vesuvius.	Wahalak.
COST OF WORK.				
<i>Dredge.</i>				
64. Pay rolls.....	\$5,063.40	\$1,485.10	\$4,781.43	\$18,970.02
65. Fuel for boilers.....	2,137.22	422.45	486.78	5,074.17
66. Coal for galley.....	13.75	5.00	2.46	20.54
67. Water.....	114.62	.....	.....	67.23
68. Supplies, subsistence.....	2,947.86	631.07	710.26	6,155.70
69. Supplies, engine room.....	506.09	93.23	283.31	808.06
70. Other supplies.....	1,549.81	381.88	798.32	655.82
71. Renewals or additions to outfit.....	.....	.....	2.73	1,397.76
72. Ordinary repairs:				
(a) Hull.....	82.75	660.01	.....	1,310.57
(b) Machinery (exclusive of main dredging pump).....	457.54	2,078.17	.....	1,044.68
74. Laundry, ice, miscellaneous expenses.....	20.71	28.15	84.69	262.31
Total.....	\$16,863.87	\$5,781.12	\$7,150.96	\$39,381.96
<i>Main dredging pump.</i>				
76. Diameter of runner.....		72 inches.	50 inches.	90 inches.
77. Volts (lined or unlined).....		Lined	Lined front and back only	Unlined.
		Number pur- chased.	Number pumping hours used.	Number pur- chased.
		Number pumping hours used.	Number pumping hours used.	Number pumping hours used.
		Total cost.	Total cost.	Total cost.
78. Renewals:				
(a) Volts.....				
(b) Runner.....				
(c) Volts liners.....				
(d) Runner liners.....				
(e) Head and back liners.....				
79. Miscellaneous repairs.....				
Total.....				

Pipe line.									
31. Renewals:							6		43
(a) Rubber sleeve.								\$273.00	\$1,283.40
(b) Pipe.....									
(c) Pontoon.									183.90
(d) Onfit.									3,792.35
32. Repairs.....									
33. Miscellaneous.									
34. Total.....								\$273.00	\$5,211.65
Towboats and launches.									
35. Pay rolls.....									10 2,690.67
36. Fuel for boilers.....									11 562.88
37. Coal for galley.....									12 10.24
38. Water.....									13 8.25
39. Supplies, subsistence.									14 567.00
40. Supplies, engine room.									15 157.77
41. Launch supplies.....									16 546.23
42. Other supplies.....									17 71.25
43. Renewals of or additions to outfit.									18 23.10
44. Ordinary repairs.....									19 118.66
45. Laundry, (co, miscellaneous expenses, etc.).....									20 28.42
46. Total.....									5,709.46
Barges (amounts chargeable to dredge).									
47. Ordinary repairs to barges.									121.09
48. Miscellaneous expenses.....									
49. Total field cost.....									121.09
50. Total field cost per cubic yard (cents).....									47,424.06
Extra expenses.									
51. Office expenses, superintendence, surveys, etc. ¹									4,718.05
52. Extraordinary repairs to dredge:									
(a) Hull.....									21.75
(b) Machinery (exclusive of main dredging pump).									741.76
53. Extraordinary repairs to towboats and launches.									249.27
54. Extraordinary repairs to barges.....									62.83
55. Total.....									6,763.66
56. Gross cost per cubic yard (cents).....									11 53,217.72

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Talbot, Captain Andrew.	Thames.	Vesuvius.	Whaleback.								
MISCELLANEOUS.												
107. Number of pounds of fuel per yard of material.		234.	4.07 pounds.....	2.34.								
108. Fuel consumed by dredge, tons or barrels.		234.50 tons.....	343 long tons.....	2,703.18 short tons; 2,415 long tons.								
109. Fuel consumed by auxiliary plant, tons or barrels.		28 tons.....	16 tons; 14.3 long tons.....	242.5 long tons.								
110. Cost of fuel.....		\$2.10.....	\$2,785.6 per ton.....	\$6,276.83.								
111. Water purchased.....			None.....	752,500 gallons.								
112. Cost of water per 1,000 gallons.....			None.....	10 cents (about).								
113. Cost per cubic yard per hour at work.			None.....	\$0.0167								
114. Linear feet of pipe line built during year and cost per linear foot.			do.....	None.								
115. Linear feet of embankment built during year and cost per linear foot.		648,000.....	688,000.....	Do.								
116. Area in square feet cut over by dredge during year.		5 feet.....	7.38 feet.....	13,185,086.								
117. Average increase of depth of channel cut over.				4.3 feet M.; 3.3 feet P. A. H.								
	<i>Remarks.</i> This dredge was operated on Mattewan Creek, N. J., and Woodbridge Creek, N. J., until Feb. 20, when it was exchanged for the new dredge General G. L. Gillespie. Data shown is all that is now available.	<i>Remarks.</i> <table><tr><th>Locality.</th><th>Amount dredged.</th></tr><tr><td>Grand Tower.....</td><td>Cubic yards. 19,000</td></tr><tr><td>Grand Tower Land- ing.....</td><td>68,800</td></tr><tr><td></td><td>88,400</td></tr></table>	Locality.	Amount dredged.	Grand Tower.....	Cubic yards. 19,000	Grand Tower Land- ing.....	68,800		88,400	<i>Remarks.</i> Dredge Vesuvius was in commission 91 days dredging in channel and placing sand on range for base of spur dams in the Mississippi River, in the vicinity of Brownsville, Minn., and Genoa, Wis. Includes pontoons. Winter repairs to dredge, winter 1915-16.	<i>Remarks.</i> Original contract cost. First cost, including necessary changes. Galley, mess, and crew's outfit. Mobile Harbor, 2,083,427.45; Pass Aux Herons, 260,223.3; theoretical yardage. Mobile Harbor, 2,085,778.4; Pass Aux Herons, 308,179.6, total yardage. 2,680.18 short tons, at \$2.11. 7 14 short tons, at \$2.11. 670,000 gallons, at 10 cents (average). 959 sleeves previously purchased were worn out in a total of 58,030.9 hours, an average of 983.57 hours per sleeve. Of the 30 sleeves purchased and 13 received from the dredge Pascagoula this year, 3 were worn out
Locality.	Amount dredged.											
Grand Tower.....	Cubic yards. 19,000											
Grand Tower Land- ing.....	68,800											
	88,400											

by storm after a total of 104.1 hours, an average of 35.47 per sleep; 18 have been used a total of 1,039.6 hours and are still in service, and 22 are new and still on hand.

- " 12 men, at \$110 to \$25.
- " 206.7 short tons, at \$2.11.
- " 4.86 short tons, at \$2.11.
- " 82,400 gallons, at 10 cents.
- " The total cost includes \$3,372.58 for storm damage due to hurricane of July 5, 1916.
- " Item 75, items 72-73 a and b, item 96, items 93, 94, item 93.

All coal was bought by the short ton and is so expressed above.

The dredge was out of commission for a period of 84 months on account of lack of funds and damage caused by hurricane of July 5, 1916.

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Wahkiakum.	Warroad.	Waterway.	Zeda.
1. District.....	Second, Portland, Ore.	St. Paul, Minn.	Vicksburg, Miss.	St. Louis, Mo., Mississippi River Commission.
2. When built.....	1913.	1904.	1912.	1898.
3. Where built.....	Portland, Ore.	Warroad, Minn.	Dubuque, Iowa.	Grafton, Ill.
4. Builder.....	Portland Iron Works.	United States Engineers.	Dubuque Boat & Boiler Works.	Springfield Boiler & Manufacturing Co.
5. Time to build.....	17 months.	11 months.	16½ months.	15 months.
6. Material of hull.....	Steel.	White oak and fir.	Steel.	Steel.
7. Contract cost of dredge.....	\$174,236.50.	\$26,500.	\$97,692.	\$109,000.
8. (a) Cost of outfit; (b) cost of pipe line.....	(a) \$5,108.25; (b) \$27,341.	(a) \$1,947.83; (b) \$3,500.37.	(a) \$2,712.46; (b) included in 7.	162 feet.
9. Length.....	269 feet 4½ inches (hull proper, 183 feet 1½ inches).	158 feet.	163 feet.	40 feet.
10. Beam.....	30 feet (hull proper, 38 feet).	27 feet.	34 feet.	7 feet 6 inches.
11. Depth.....	9 feet 6 inches.	8 feet 6 inches.	7 feet.	3 feet 5 inches.
12. Draft.....	6 feet 6 inches.	3 feet.	38 inches.	4 feet 8 inches.
13. (a) Forward.....	5 feet 8 inches.	4 feet.	41 inches.	650.
14. (b) Aft.....	1,135.	260.	417.	43.
15. Displacement (long tons).....	49.	11.	30.	None.
16. Number of crew.....	None.	Two 10 by 60 inch, horizontal stroke.	Two 12-inch cylinders, 72-inch stroke.	Two 16 and 26 by 18 inch, horizontal tandem compound.
17. Number, size, and type of propelling engines.....	One 19 and 30 and 35 and 26 by 16 inch stroke, 4-cylinder triple-expansion angle engine.	Two 9 by 9 inches, direct connected, 75 indicated horsepower.	10, 16, 26 by 12 inches.	None.
18. Cutter engines.....	8-inch and 16-inch double-cylinder tandem.	7 inches.	7 inches.	None.
(a) Diameter of cylinders.....	12 inches.	8 inches.	10 inches.	6½ inches.
(b) Stroke.....	9 inches.	9 inches.	8½ inches.	8 inches.
19. Hauling engines.....	12 inches.	12 inches.	8 inches.	6 Mississippi River, cylindrical flue.
(a) Diameter of cylinders.....	12 inches.	12 inches.	28 feet.	28 feet 6½ inches.
(b) Stroke.....	4 Hawkes marine.	2 Scotch marine.	43 inches, 5 flues 10 inches.	48 inches.
(c) Number and type.....	13 feet 11 inches, length of drum or steel.	109 inches.	1,000 square feet.	154 square feet.
(d) Length.....	78 inches.	72 inches.	32.3 square feet.	600 and 650.
(e) Diameter.....	9,120 square feet.	60 square feet.	168.	32 inches.
(f) Floating surface (total).....	226 square feet.	130.	16 inches.	
(g) Grate surface (total).....	1,600.	12 inches.		
20. Discharge pipe in use (average number of feet).....	24 inches, inside diameter.			
21. Diameter of discharge pipe.....				

22. Pontoon: (a) Number and material of those in use (average). (b) Dimensions.....	55 wood. 26 feet 8 inches by 12 feet 4 inches by 2 feet 5 inches. Nonpropelling.....	4, air. Length, 24 feet; beam, 10 feet; depth, 2 feet 4 inches. 16.....	4, steel. 47 feet 8 inches long, 12 feet wide, 3 feet deep. 14.....	10, steel. 170.
23. Revolutions per minute of propelling engines.....	190 to 215.....	265.....	218.....	Upstream with water jet 102 pounds. Bituminous. 10.03 pounds. 9.68 inches.
24. Revolutions per minute of pumping engines.....	Spiral. 7 feet 14 inches over all. 74 inches. Open, elliptical. 7.....	3 steel blades parallel with shaft. 214 inches. 3 inches. 12-inch cast iron pipe. 50.....	8-blade spiral. 4 feet 24 inches. 54 inches. Suction with cutter head. 10.....	Water-jet agitator. Upstream with water jet 102 pounds. Bituminous. 10.03 pounds. 9.68 inches.
25. Type of agitator or cutter head.....	7 feet 14 inches over all. 74 inches. Open, elliptical. 7.....	3 steel blades parallel with shaft. 214 inches. 3 inches. 12-inch cast iron pipe. 50.....	8-blade spiral. 4 feet 24 inches. 54 inches. Suction with cutter head. 10.....	Water-jet agitator. Upstream with water jet 102 pounds. Bituminous. 10.03 pounds. 9.68 inches.
26. Diameter of cutter shaft.....	7 feet 14 inches over all. 74 inches. Open, elliptical. 7.....	3 steel blades parallel with shaft. 214 inches. 3 inches. 12-inch cast iron pipe. 50.....	8-blade spiral. 4 feet 24 inches. 54 inches. Suction with cutter head. 10.....	Water-jet agitator. Upstream with water jet 102 pounds. Bituminous. 10.03 pounds. 9.68 inches.
27. Diameter of cutter shaft.....	7 feet 14 inches over all. 74 inches. Open, elliptical. 7.....	3 steel blades parallel with shaft. 214 inches. 3 inches. 12-inch cast iron pipe. 50.....	8-blade spiral. 4 feet 24 inches. 54 inches. Suction with cutter head. 10.....	Water-jet agitator. Upstream with water jet 102 pounds. Bituminous. 10.03 pounds. 9.68 inches.
28. Type of suction head.....	7 feet 14 inches over all. 74 inches. Open, elliptical. 7.....	3 steel blades parallel with shaft. 214 inches. 3 inches. 12-inch cast iron pipe. 50.....	8-blade spiral. 4 feet 24 inches. 54 inches. Suction with cutter head. 10.....	Water-jet agitator. Upstream with water jet 102 pounds. Bituminous. 10.03 pounds. 9.68 inches.
29. Revolutions per minute of cutter head.....	190 to 215.....	265.....	218.....	Upstream with water jet 102 pounds. Bituminous. 10.03 pounds. 9.68 inches.
30. Average boiler pressure (gauge).....	190 to 215.....	265.....	218.....	Upstream with water jet 102 pounds. Bituminous. 10.03 pounds. 9.68 inches.
31. Kind of coal used.....	190 to 215.....	265.....	218.....	Upstream with water jet 102 pounds. Bituminous. 10.03 pounds. 9.68 inches.
32. Average gauge pressure in discharge pipe.....	190 to 215.....	265.....	218.....	Upstream with water jet 102 pounds. Bituminous. 10.03 pounds. 9.68 inches.
33. Average vacuum in suction pipe.....	190 to 215.....	265.....	218.....	Upstream with water jet 102 pounds. Bituminous. 10.03 pounds. 9.68 inches.
ATTENDANT PLANT.				
Towboat.				
34. Name of tug attached to dredge.....	J. C. Post.....	None.....	None.....	Leota. 13. 560 long tons. 4 feet. 4 feet 7 inches.
35. Number of crew.....	4.....	None.....	None.....	Leota. 13. 560 long tons. 4 feet. 4 feet 7 inches.
36. Displacement.....	95 tons.....	None.....	None.....	Leota. 13. 560 long tons. 4 feet. 4 feet 7 inches.
37. Draft: (a) Forward..... (b) Aft.....	5 feet 4 inches. 7 feet.....	None.....	None.....	Leota. 13. 560 long tons. 4 feet. 4 feet 7 inches.
Launches.				
38. Name.....	None.....	Bull call.....	None.....	Leota. 13. 560 long tons. 4 feet. 4 feet 7 inches.
39. Length.....	None.....	23 feet.....	None.....	Leota. 13. 560 long tons. 4 feet. 4 feet 7 inches.
40. Beam.....	None.....	9 feet 3 inches.....	None.....	Leota. 13. 560 long tons. 4 feet. 4 feet 7 inches.
41. Depth.....	None.....	9 feet 4 inches (molded depth). Forward, 1 foot 2 inches; aft, 2 feet 4 inches. 1 ton.....	None.....	Leota. 13. 560 long tons. 4 feet. 4 feet 7 inches.
42. Draft.....	None.....	9 feet 4 inches (molded depth). Forward, 1 foot 2 inches; aft, 2 feet 4 inches. 1 ton.....	None.....	Leota. 13. 560 long tons. 4 feet. 4 feet 7 inches.
43. Displacement.....	None.....	9 feet 4 inches (molded depth). Forward, 1 foot 2 inches; aft, 2 feet 4 inches. 1 ton.....	None.....	Leota. 13. 560 long tons. 4 feet. 4 feet 7 inches.
Barges.				
44. Identifying numbers of barges in use.....	1, 2, 3, and 8.....	9.....	None.....	Leota. 13. 560 long tons. 4 feet. 4 feet 7 inches.
45. Usage.....	Barging fuel.....	Pipe floats.....	None.....	Leota. 13. 560 long tons. 4 feet. 4 feet 7 inches.
46. Displacement, light (each).....	115 tons.....	4 tons.....	None.....	Leota. 13. 560 long tons. 4 feet. 4 feet 7 inches.
47. Capacity of barges (each).....	400 tons.....	15 tons.....	None.....	Leota. 13. 560 long tons. 4 feet. 4 feet 7 inches.

TABLE V.—*Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.*

Name.....	Work performed.	Wabkiakum.			Warroad.			Waterway.			Zeda.		
		Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.	Hours.	Minutes.	Percentage.
WORK PERFORMED.													
48. Location of dredging.....	Lower Columbia River.....				No dredging during 1916.....						See remarks.		
49. Average depth before dredging.....	25 feet.....										4 feet.....		
50. Average depth after dredging.....	304 feet.....										91 feet.....		
51. Character of material dredged.....	Sand; small per cent of gravel.....										Clay and sand.....		
52. Rate of advance per hour (in feet straight ahead).....	10.52.....										214.....		
53. Amount dredged during the year.....	2,286,975 cubic yards.....										59,632 cubic yards.....		
54. Total amount dredged by this dredge at this locality.....	5,824,478 cubic yards.....										See remarks.....		
55. Average amount dredged: (a) Per hour (pumping).....	662 cubic yards.....										255 cubic yards.....		
(b) Per day.....	12,026 cubic yards.....										1,458 cubic yards.....		
56. Maximum amount dredged in one month.....	371,340 cubic yards.....										17,920 cubic yards.....		
57. Total number of days upon which any dredging was done.....	191.....										51.....		
58. Average number of working hours per working day.....	19.673.....										8.....		
59. Maximum number of working hours per working day.....	24.....										8.....		
DISTRIBUTION OF TIME.													
60. Time at work:													
(a) Pumping.....	3,467.....	45	39.47%								246.....	2.93	55
(b) Handling pipe line.....	197.....	55	2.253								73.....	.84	10
(c) Handling swinging wire (cleaning suction).....	77.....		.877										45
(d) Going to and from wharf or anchorage.....	2.....	20	.027								18.....	.21	
(e) Placing dredge.....	13.....	40	.144								8.....	.10	40
(f) Waiting for vessels to pass.....													60
													61
													70

FLOATING PLANT.

4147

[illegible]

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Wahkiakum.	Warroad.	Waterway.	Zeta.
COST OF WORK—continued.				
Main dredging pump.				
76. Diameter of runner.....	6 feet 4 inches.	40 inches	50 inches	69 inches.
77. Volute (lined or unlined).....	Lined.....	Unlined.....	Lined; removable steel liners.....	Unlined.....
78. Renewals:				
(a) Volute.....				
(b) Runner.....				
(c) Volute liners.....				
(d) Runner liners.....				
(e) Head and back liners.....				
79. Miscellaneous repairs.....				
80. Total.....	\$2,604.19			\$4.87
81. Renewals:				
(a) Rubber sleeves.....				
(b) Pipe.....	* 17 580-6,000			
(c) Pontoon.....				
(d) Outfit.....				
82. Repairs.....				
83. Miscellaneous.....				
84. Total.....	2,004.61			20.98
Torpedoes and launches.				
85. Pay rolls.....	2,913.83			2,989.07
86. Fuel for boilers.....	u 1,172.46			1,664.88
87. Coal for galley.....	(u)			24.00

[illegible]

TABLE V.—Performances of pipe-line hydraulic dredges for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Wahkiakum.	Warroad.	Waterway.	Zeda.
MISCELLANEOUS—Continued.				
115. Linear feet of embankment built during year and cost per linear foot.	None.....	None.....		
116. Area in square feet cut over by dredge during year.	10,947,000.....	do.....	305,900.....	1,400,165 square feet.
117. Average increase of depth of channel cut over.	5½ feet.....		5 feet.....	5.7 feet.
	<i>Remarks.</i> 1 Does not include outfit, pipe line, nor attendant plant. 2 Includes 80 pontoons, 2,400 feet pontoon pipe, and 800 feet of shore pipe, etc. 3 1,586,413 cubic feet of hogged wood, 21 pounds per cubic foot, at 30 cents per 100 cubic feet. 4 27 tons, at \$2.90. 5 Flat rate of \$5 per month for 4 months; balance free. 6 Indefinite. 7 Two runners last about 4,000 pumping hours. 8 Various. 9 Number used. 10 1,231.37 barrels, at \$0.75 and \$1.10. 11 Supplied from dredge. 12 Includes alterations to pilot house. Labor cost of crew operating main dredging pump, \$17,945.00; pipe line, barges, and anchors, \$15,824.30; extra labor, \$144.	<i>Remarks.</i> No dredging was done during the year, channel depths being sufficient and the project having been completed to an adequate extent for present navigation requirements. In May the dredge was loaned by authority of the Chief of Engineers to the United States Lake Survey office (Detroit) for occupancy as a quarter boat by a survey party making a hydrographic survey of the Lake of the Woods. 1 No renewals.	<i>Remarks.</i> Localities dredged and cubic yards removed at each place: Barbin Reach, lower Red River, La., 3,044; Alexandria Reach, lower Red River, La., 7,000; Mouth of Black River, lower Red River, La., 17,900; Sugar House chute, lower Red River, La., 4,700; below Harrisonburg, Black River, La., 4,523; wrong end of Old River, Yazoo River, Miss., 4,000; Belcher Bar, Yazoo River, Miss., 950; near mouth Big Sunflower River, Miss., 17,515. 1 349.5 tons, at \$5. 2 6 tons, at \$5.	<i>Remarks.</i> Work done in Mississippi River in Memphis Harbor, and Ohio River at Little Chain, Moseley's Grand Chain. Fuel purchased by short tons.

TABLE VI.

DIPPER DREDGES.

4151

TABLE VI.—Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916.

Name, letter, or number.	Adams, Col. M. B.	Adison.	Ayer.	Appleton.
1. District.....	Wheeling, W. Va.....	Wheeling, W. Va.....	Rock Island, Ill.....	Milwaukee, Wis.....
2. Length.....	112 feet.....	75 feet.....	73 feet.....	90 feet.....
3. Beam.....	34 feet.....	30 feet.....	26 feet.....	32 feet.....
4. Depth.....	7 feet 3 inches.....	7 feet 2 inches.....	6 feet.....	7 feet.....
5. Draft:				
(a) Forward.....	5 feet, 6 inches.....	3 feet 2 inches.....	3 feet 6 inches.....	3 feet 6 inches.....
(b) Aft.....	3 feet 4 inches.....	2 feet 6 inches.....	1 foot 7 inches.....	2 feet 8 inches.....
6. Displacement.....	525 tons.....	177 tons.....	124 tons.....	214 tons.....
7. Builder:				
(a) Hull and material of hull.....	Marion Steam Shovel Co., steel.....	United States, wood.....	H. S. Brown.....	Wood. ¹
(b) Machinery.....	do.....	Osgood Dredge Co.....	Osgood Dredge Co.....	Unknown.
8. Where built.....	Huntington, W. Va.....	Kanawha River, W. Va.....	Quincy, Ill.....	Dubuque, Iowa.
9. When built.....	1912.....	1880, rebuilt 1910.....	1876.....	1872.....
10. Time to build.....	8 months.....	To rebuild about 5 months.....	Not known.....	Unknown.
11. Contract cost.....	\$43,500.....	\$14,000 (about).....	\$11,300 purchase cost.....	\$13,000.....
12. Finished cost with outfit (exclusive of scows, tugs, and launches).	\$44,577.86.....			\$13,000.....
13. Bucket:				
(a) Type.....	Dipper (2).....	Dipper.....	Dipper.....	Scoop dipper.
(b) Capacity.....	2 cubic yards and 4 cubic yards.....	14 cubic yards.....	14 cubic yards.....	One 2½; one 1.13; one 1.31 cubic yards.
14. Length of boom.....	40 feet.....	31 feet.....	30 feet.....	39 feet (dipper handle)
15. Maximum dredging depth.....	21 and 26 feet (interchangeable dipper handles).	16 feet.....	17 feet.....	17 feet.....
16. Dimensions of main hoisting-engine cylinders.....	13 by 16 inches.....	9 by 18 inches.....	8 by 16 inches.....	12-inch diameter, 14-inch stroke.
17. Dimensions of swinging engine.....	9 by 9 inches.....	Cylinders 6½-inch bore and 8- inch stroke.	None, swings from main engine.....	8-inch diameter, 12-inch stroke.
18. Boilers:				
(a) Number.....	1.....	1.....	1.....	1.....
(b) Type.....	Locomotive.....	Locomotive fire box.....	Upright.....	Scotch marine; Adams turnase
(c) Dimensions.....	72 inches by 18 feet.....	64 inches by 15 feet 6 inches.....	4 feet 8 inches by 10 feet.....	42 inches diameter.
(d) Number, diameter, and length of tubes in 1 boiler.....	180, 24 inches, 11 feet ½ inch long.	94; 24 inches; 118½ inches.....	144; 2 inches diameter, 67 inches long.	12 feet 8 inches long, 90 inches diameter.
(e) Heating surface (total).....	1,349 square feet.....	555 square feet.....	456 square feet.....	90; 3 inches diameter 9 feet 8½ inches long.
(f) Grate surface (total).....	274 square feet.....	16 square feet.....	12 square feet.....	900 square feet.
19. Working steam pressure.....	125 pounds.....	90 pounds.....	120 pounds.....	25 square feet. 110 pounds.

ATTENDANT PLANT.
Tugboats.

20. Name of tug attached to dredge.
21. Owner.
22. Number of crew.

Gen. Craighill.
United States
7.

James Rumsey.
United States
8.

Ruth, Grace and Le Claire, in-
ternationally.
United States
6 to 11.

Fox and Wolf.
United States
Fox 7, Wolf 8.

Launches.

23. Name.
24. Number of crew.

None.

None.

None.

Scows.

25. Number of scows in use.
26. Type.
27. Capacity (each).

2. Side dump, wood.
95 cubic yards.

2. Side dump.
60 cubic yards.

4. Flat.
400 tons.

3. 2 side dump; 1 open.
Scows 65 cubic yards; open scow
1 ton.
Dump scows 1 and 2; open scow
No. 8.

28. Identifying letter or number.
WORK PERFORMED.

U. S. E. D. Wheeling Nos. 27
and 28.

Nos. 33 and 34.

Nos. 272, 273, 274, 286.

Le Claire Cana.

29. Location of dredging.
30. Average depth before dredging.
31. Average depth after dredging.
32. Average width of cut.
33. Total distance cut ahead by dredge,
in feet.

Dam No. 22, Ohio River.
(1) 5 feet 8 inches.
(2) 9 feet.
(3) 16 feet.
(4) 13,670.

Kanawha River, W. Va.
5 feet 8 inches.
9 feet.
16 feet.
13,670.

Le Claire Cana.
4.5 feet.
6.9 feet.
25 feet.
10 feet (without moving dredge.)

Fox River Improvement.
4.5 feet.
6.9 feet.
25 feet.
10 feet (without moving dredge.)

34. Total amount dredged in cubic yards
during year:
(a) Rock; (1) unit cost.
(b) Sand and mud; (2) unit cost.

(c) None.
(b) 322,270; (2) \$0.655.

(b) 12,019 cubic yards; (2) \$0.405.

(b) 62,908; (2) 7.3 cents.

(b) 62,908; (2) 7.3 cents.

35. Average number of cubic yards
dredged:
(c) Per day.
(d) Per hour.

1,426.
178.

358.
45.

210 cubic yards.
45 cubic yards.

410.5.
61.4.

36. Maximum number of cubic yards
dredged:
(e) In 1 day.
(f) In 1 hour.

3,500.
438.

800.
100.

300 cubic yards.
37 cubic yards.

1,162.
145.
6.7.

37. Average number of hours worked per
day.
(g) In 1 day.
(h) In 1 hour.

8.
226.

84.

68.

153.

38. Total number of days upon which
any dredging was done.
39. Average distance in miles from work
to dump.

1.
184.

184.

3.

Material banked.

40. Number of scows loaded during year.
41. Number of scows loaded per day.
42. Average time to load 1 scow.
43. Average load in cubic yards per scow.

2,513.
35 maximum; 16 to 18 average.
1 hour, 30 minutes.
90.

184.
Average 2
1 hour, 30 minutes
60.

184.
Average 3
2.66 hours
70.

184.
Average 3
2.66 hours
70.

TABLE VI.—Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.	Adams, Col. M. B.		Addison.		Ayer.		Appleton.	
	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
WORK PERFORMED—continued.								
44. Average time to tow load to dump and return.	20 to 25 minutes.		30 minutes.		1.5			
45. Number of scoops per tow.	1.		1.		1.			
46. Character of dredged material and average percentage:								
(a) Mud.	Practically none.							10.
(b) Rock.	None.							90.
(c) Sand.	100 per cent, includes gravel.				100.			
Distribution of effective working time in hours.								
47. Dredging.	1,174		630		544		1,022	20
48. Handling scoops.	72		28					
49. Spudding up.	26		14					
50. Miscellaneous.	519						104	
Distribution of time lost in hours.								
51. Repairing:								
(a) Hull.	191						4	
(b) Machinery.	382		72				120	30
52. Bad weather.	751						6	
53. Changing location of plant.	127		182				110	
54. Delays.	16		80				118	
55. Sundays and holidays.	888		224		96		288	
56. Out of commission.	172		7,400		3,432		7,000	
57. Miscellaneous.	4,456				4,688			
58. Total number of hours in year.	8,784		8,784		8,784		8,784	
COST OF WORK.								
Dredge.								
59. Pay rolls.	\$7,948.64		\$3,118.33		\$980.00		\$3,273.45	
60. Coal.	1,863.45		97.43		176.00		763.21	
61. Supplies:								
(a) Maintenance.	897.17		52.10		284.18		41.93	
(b) Machinery.								
(c) Miscellaneous.	2,112.71		81.78		65.67		16.88	

62. Renewals or additions to outfit.....	752.26				
63. Ordinary repairs:					
(a) Hull.....	4,297.11				
(b) Machinery.....	2,437.93				
(c) Miscellaneous.....	163.17				
64. Laundry, ice, miscellaneous.....					
65. Total.....	\$17,539.18	\$4,234.41	\$1,571.85	\$4,140.00	
<i>Towboat.</i>					
66. Operating cost for year.....		6,576.61			
67. Ordinary repairs.....	(⁹)	199.03			
68. Total.....		6,745.64	3,003.62		435.79
<i>Launch.</i>					
69. Operating cost for year.....	(⁹)				
70. Ordinary repairs.....					
71. Total.....					
<i>Barges and scows.</i>					
72. Ordinary repairs.....	117.11				
73. Total.....	117.11		300.05		
74. Total field cost.....	\$17,706.29	\$10,980.05	\$4,875.52		\$4,576.39
<i>Gross cost.</i>					
75. Office expenses, superintendence, surveys, etc.....	None.....	150.00			85.00
76. Extraordinary repairs to dredge:					
(a) Hull.....	do.....				
(b) Machinery.....	do.....	268.20			910.87
77. Extraordinary repairs to towboats and launches.....	(⁹).....	398.60			843.13
78. Extraordinary repairs to barges and scows.....		5,598.55			
79. Grand total.....	23,302.84	11,894.85	6,000.72		6,415.39
<i>Cost per cubic yard.</i>					
80. Field cost per cubic yard:					
(a) Mud or sand.....	\$0.055.....		750.405		7.3 cents.
(b) Rock.....					
81. Gross cost per cubic yard:					
(a) Mud or sand.....	\$1.0723.....		750.499		10.3 cents.
(b) Rock.....					

TABLE VI.—Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.....	Adams, Col. M. B.	Addition.	A for.	Appledon.
MISCELLANEOUS.				
82. Fuel consumed by dredge in long tons.	925.	95.	49.	179.46.
83. Fuel consumed by auxiliary plant in long tons.	(6).	897.	180.	
84. Cost per hour of effective working time.	\$13.01		\$11.04.	\$5.69.
85. Cost of fuel per ton.....	\$1.82 to \$3.92.	\$1.02 (average).	\$3.08.	\$4.25.
86. Number of days in commission.....	328.	173.	87.	223.
<p>Remarks.</p> <p>¹ Not applicable. The dredge is used on various kinds of work, such as removing coffer-dam, banking and filling coffer-dams, cutting channels and harbors for floating plant during extreme low water, etc. It is impossible to furnish an exact unit cost per yard considering conditions of employment.</p> <p>No steamboat is regularly employed in connection with the operation of the dredge. The Gen. Craighill is also used in miscellaneous work which requires the use of a steamboat in building Lock and Dam No. 22, Ohio River.</p> <p>² Including wire hoisting line.</p> <p>³ Including manila rope, spud lines, rolling log, etc.</p> <p>⁴ Including spud timbers.</p> <p>⁵ See report for steamer Gen. Craighill.</p> <p>⁶ No launch with outfit.</p>				
<p>Remarks.</p> <p>Operated on Kanawha River.</p> <p>¹ In addition to the 184 scoops loaded by the dredge, which contained 11,040 cubic yards of material, 19,040 cubic yards of material was cast. The dredge removed 25 snags and 5 barge bottoms during the year for which no separate cost was kept.</p> <p>² It is not practicable to separate the cost of the different materials. There is no real rock excavation, but there is a mixture of different sized stones and sand, as well as mud deposits, in places.</p>				
<p>Remarks.</p> <p>Mississippi River, Rock Island Division, LeClair Canal, dredging sand for core filler in dam.</p>				
<p>Remarks.</p> <p>¹ Rebuilt by United States in 1906 and 1907.</p>				

Name, letter, or number.....	Atalla. ¹	Carrollton.	Champong.	Cheraw.
1. District.....	Montgomery, Ala.....	Cincinnati, Ohio, second district.	Second Portland, Oreg..	Charleston, S. C.
2. Length.....	76 feet.....	86 feet.....	80 feet.....	155 feet.
3. Beam.....	26 feet 4 inches.....	30 feet.....	30 feet.....	28 feet 6 inches.
4. Depth.....	5 feet 6 inches.....	6 feet 9 inches.....	5 feet.....	8 feet forward; 7 feet 3 inches aft
5. Draft.....	(a) Forward.....	4 feet 4 inches.....	2 feet 10 inches.....	5 feet 6 inches.
(b) Aft.....	3 feet 5 inches.....	4 feet 4 inches.....	2 feet 7 inches.....	6 feet.
6. Displacement.....	206 long tons.....	250 tons.....	165 tons.....	620 tons.
7. Builder.....	U. S. Engineer Department; wood.	American Bridge Co., steel.	Joseph Supple; wood.....	Harlan & Hollingsworth Corporation, steel
(a) Hull and material of hull.....	Osgood Dredge Co.....	The Bucyrus Co.....	Featherstone Foundry & Machine Co.	Osgood Dredge Co.
(b) Machinery.....	Lock 4, Coosa River, Ala.	Hull at Ambridge, Pa.....	Portland, Oreg.....	Wilmington, Del.
8. Where built.....	1902.....	1915.....	1904.....	1906.....
9. When built.....	3 months.....	Unknown.....	34 months.....	1 year 6 months.
10. Time to build.....	\$10,000.....	\$22,772.....	\$19,500.....	\$15,000 (hull, frame, boom, and turntable)
11. Contract cost.....		Unknown; equipment transferred from old dredge.	\$20,500.....	\$45,500.
12. Finished cost with outfit (exclusive of scoops, tugs, and launches).				
13. Bucket:	Dipper; Bucyrus Co.	Dipper.....	Dipper.....	Dipper.
(a) Type.....	14 cubic yards.....	24 cubic yards.....	1 cubic yard.....	14 cubic yards
(b) Capacity.....	34 feet.....	40 feet.....	40 feet.....	49 feet.
14. Length of boom.....	15 feet.....	20 feet.....	23 feet.....	18 feet.
15. Maximum dredging depth.....	84 inches diameter, 12-inch stroke.....	10 inches diameter, 14-inch stroke.....	8 by 12 inches.....	16½ by 18 inches
16. Dimensions of main hoisting-engine cylinders.....	8 inches diameter, 12-inch stroke.....	18 inches diameter, 8-foot stroke.....	5 by 9 inches (2 cylinders).....	
17. Dimensions of swinging engine.....				
18. Bollers:	(a) Number.....	1.....	1.....	2.....
(b) Type.....	Marine.....	Scotch marine.....	Locomotive.....	Return tubular.
(c) Dimensions.....	14 by 6 feet.....	Length, 15 feet 6 inches; diameter, 84 inches.	42 inches by 15 feet 4 inches.	Diameter, 72 inches; length, 18 feet
(d) Number, diameter, and length of tubes in one boiler.....	48 tubes; 3 inches diameter, 9 feet long.....	Number 60; diameter, 31 inches; length 12 feet 2½ inches.	4 of 2½ inches diameter by 8 feet 9 inches long.	
(e) Heating surface (total).....	470 square feet.....	875 square feet.....	366 square feet.....	1,289 square feet.
(f) Grate surface (total).....	17½ square feet.....	20 square feet.....	12 square feet.....	40 square feet.
19. Working steam pressure.....	130 pounds.....	135 pounds.....	90 pounds.....	90 pounds.

TABLE VI.—Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.	Attelle.	Carrollton.	Champong.	Crews.
ATTENDANT PLANT.				
<i>Twoboats.</i>				
20. Name of tug attached to dredge.	None.	Kentucky ¹ .		Ida.
21. Owner.		United States.		Jenkins & McKevlin.
22. Number of crew.		Kentucky, 12; Gregory, 11.		5.
<i>Lessacks.</i>				
23. Name.	None.	Pearl ¹ .		None.
24. Number of crew.		2.		
<i>Scows.</i>				
25. Number of scows in use.	None.	1.		2.
26. Type.		Side dump.		Bottom dump.
27. Capacity (each).		125 tons.		115 and 130 cubic yards.
28. Identifying letter or number.		No. 54.		Nos. 1 and 2.
WORK PERFORMED.				
29. Location of dredging.	Dam No. 5, Coosa River, Ala.	Kentucky River	(¹)	Winyah Bay, S. C. (Samplit Bay and River).
30. Average depth before dredging.	2 feet.	2.00 feet.		154 feet.
31. Average depth after dredging.	3.5 feet.	3.5 feet.		184 feet.
32. Average width of cut.	40 feet.	30 feet.		45 feet.
33. Total distance cut ahead by dredge, in feet.	300 feet.	10,700 feet.		600 feet.
34. Total amount dredge in cubic yards during year:				
(a) Rock; (1) Unit cost.	(²) (a) 1,015; (1) \$0.078.	(b) 52,225; (2) \$0.1068.		(a) 10,400; (1) 26.31 cents.
(b) Sand; (2) Unit cost.				(b) 15,671; (2) 36.31 cents.
35. Average number of cubic yards dredged:				
(a) Per day.	254.	885.6		890.
(b) Per hour.	30.7.	88.5.		55.47.
36. Maximum number of cubic yards dredged:				
(a) In one day.	400.	1,350.		710.
(b) In one hour.	52.	163.		100.
37. Average number of hours worked per day.	8 hours and 15 minutes.	10.		7 hours 1.9 minutes.
38. Total number of days upon which any dredging was done.	4.	96.		67.
39. Average distance in miles from work to dump.	None.	1.		18.

40. Number of scoops loaded during year.....	907	73	245						
41. Number of scoops loaded per day.....	9.2	6.25	3.64						
42. Average time to load one scoop.....	60 minutes	1 hour 7.4 minutes	1 hour 55 minutes						
43. Average time to load one scoop.....	91	110.7	102.66						
44. Average time to tow load to dump and return.....	33 minutes	30 minutes	1 hour 30 minutes						
45. Number of scoops per tow.....	1	1	1						
46. Character of dredged material and average percentage:									
(a) Mud.....	50 per cent.	100 per cent.	30 per cent.						
(b) Rock.....	do		40 per cent.						
(c) Sand.....	None		30 per cent.						
<i>Distribution of effective working time in hours.</i>									
47. Dredging.....	Hours. 33	Minutes. 553	Hours. 84	Minutes. 15	Hours. 471	Minutes. 5			
48. Handling scoops.....		230							
49. Spudding up.....		39							
50. Miscellaneous.....	1,229	12							
<i>Distribution of time lost in hours.</i>									
51. Repairing:									
(a) Hull.....	12								
(b) Machinery.....	267	68							
52. Bad weather.....	336	160	12	30	107	15			
53. Changing location of plant.....	11	145			3	30			
54. Delays.....		8			18	45			
55. Sundays and holidays.....	861	600	96		384				
56. Out of commission.....	3,648				6,264				
57. Miscellaneous.....	2,383	6,946	239	15	1,103	25			
58. Total number of hours in year.....	8,784	8,784	8,784		8,784				
<i>COST OF WORK.</i>									
<i>Dredge.</i>									
59. Pay rolls.....	\$2,119.84	\$5,225.33	\$448.06		\$3,990.92				
60. Coal.....	137.28	1,060.00	167.05		1,065.60				
61. Supplies:									
(a) Substenance.....	734.22	119.74	165.53		951.74				
(b) Machinery.....	148.83	26.25	9.08		189.35				
(c) Miscellaneous.....	26.44	405.08	2.67		165.61				
62. Renewals or additions to outfit.....					255.05				
63. Ordinary repairs:									
(a) Hull.....	300.01	85.59			22.16				
(b) Machinery.....	809.11	108.37	1.50		465.82				
64. Laundry, ice, miscellaneous.....		175.20	2.83		97.62				
65. Total.....	\$4,273.76	\$7,269.55	\$796.92		\$7,204.77				

TABLE VI.—Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.....	Atalia.	Corroilton.	Champeeq.	Cheraw.
COST OF WORK—continued.				
<i>Towboats.</i>				
66. Operating cost for year.....	(*)	\$1,579.20		\$2,284.24
67. Ordinary repairs.....		86.64		
68. Total.....		\$1,665.84		\$2,284.24
<i>Launch.</i>				
69. Operating cost for year.....	(*)	80.78		
70. Ordinary repairs.....		3.92		
71. Total.....		84.70		
<i>Barges and scows.</i>				
72. Ordinary repairs.....	(*)			
73. Total.....				
74. Total field cost.....		\$0,012.00		\$0,489.01
<i>Gross cost.</i>				
75. Office expenses, superintendence, surveys, etc.....	408.75	300.00		96.73
76. Extraordinary repairs to dredge: (a) Fuel.....				
(b) Machinery.....		906.11		
(c) Repairs.....		456.42		
77. Extraordinary repairs to towboats and launches.....		426.72		
78. Extraordinary repairs to barges and scows.....				
79. Grand total.....	4,685.51	11,101.34	1,246.15	12,699.15
<i>Cost per cubic yard.</i>				
80. Field cost per cubic yard: (a) Mud or sand.....		\$0.1006	13.84 cents.	36.31 cents.
(b) Rock.....				36.31 cents.
81. Gross cost per cubic yard: (a) Mud or sand.....	\$0.071 (sand mud).	\$0.1349	13 cents.	48.48 cents.
(b) Rock.....	\$0.078 (sand mud).			48.48 cents.

275

oogle

MISCELLANEOUS.

82. Fuel consumed by dredge, in long tons.
83. Fuel consumed by auxiliary plant, in long tons.
84. Cost per hour of effective working time.
85. Cost of fuel per ton.
86. Number of days in commission.

[illegible]

TABLE VI.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916—Continued.*

Name, letter, or number.....	Cincinnati.	Decemport.	Frankfort.	Galliard, Col. D. D.
1. District.....	First, Cincinnati, Ohio.....	Rock Island, Ill.....	Second, Cincinnati, Ohio.....	Duluth, Minn.....
2. Length.....	On deck, 112 feet.....	110 feet.....	72 feet.....	116 feet.....
3. Beam.....	34 feet.....	40 feet.....	28 feet.....	40 feet.....
4. Depth.....	6 feet 10 inches on center line.....	6 feet.....	5 feet 5 inches.....	Dipper end 11 feet 6 inches; after end 9 feet 6 inches.....
5. Draft:				
(a) Forward.....	3 feet.....	3 feet 6½ inches.....	3 feet.....	7 feet 3 inches.....
(b) Aft.....	3 feet.....	2 feet 10½ inches.....	2 feet.....	6 feet 1 inch.....
6. Displacement.....	297 long tons (at 3 feet draft).....	348 long tons.....	115 tons.....	Estimate 780 tons.....
7. Builder:				
(a) Hull and material of hull.....	M. A. Sweeney Shipyard & Foundry Co. Steel frames, with ingot iron plating to above water line.....	Rock Island Bridge & Iron Works, Osmond Dredge Co., Marlon, Ohio.....	United States Engineering Department, The Marlon Steam Shovel Co., Lock No. 39, Ohio River.....	Hartmann-Grelling Co. Bucyrus Co. Green Bay, Wis.....
(b) Machinery.....	Jeffersonville, Ind.....	Rock Island, Ill.....	Lock No. 39, Ohio River.....	1916.....
8. Where built.....	Jeffersonville, Ind.....	Rock Island, Ill.....	Lock No. 39, Ohio River.....	1916.....
9. When built.....	1913-1915.....	1914.....	1915.....	14 months.....
10. Time to build.....	25.8 months.....	1 year.....	Unknown.....	\$108,184.....
11. Contract cost.....	\$81,490.....	\$56,663.....		\$112,685.48.....
12. Finished cost with outfit (exclusive of masts, tugs, and launches).....	\$70,656.36 1.....			
13. Bucket:				
(a) Type.....	Messabe, manganese steel.....	Dipper.....	Dipper.....	Dipper.....
(b) Capacity.....	24 cubic yards.....	2 cubic yards.....	11 cubic yards.....	44 cubic yards.....
14. Length of boom.....	Crane, 24.8 feet from center.....	45 feet.....	31 feet.....	30 feet.....
15. Maximum dredging depth.....	Open channel, 15 feet; harbor, 18 feet.....	18 feet.....	18 feet.....	30 feet.....
16. Dimensions of main hoisting-engine cylinders.....	12 by 16 inches.....	Double cylinder, 12 by 16 inches.....	8 inches diameter; 10-inch stroke.....	14 by 16 inches.....
17. Dimensions of swinging engine.....	18 inches diameter; 7½-foot stroke.....	Double cylinder, 8 by 8 inches.....		9 by 9 inches.....
18. Boilers:				
(a) Number.....	1 main, 1 auxiliary.....	1.....	1.....	1.....
(b) Type.....	Hawkes combined fire and water tube.....	Locomotive fire box.....	Fire box; tubular.....	Scotch marine.....
(c) Dimensions.....	60 inches diameter by 14 feet.....	6 feet 6 inches diameter; 20 feet 6 inches long.....	15 feet by 50 inches.....	12 feet diameter; 11 feet 2 inches long.....
(d) Number, diameter, and length of tubes in one boiler.....	(*).....	245; 2 inches.....	No. 102; 2 inches; length, 9 feet.....	196 tubes; 3 inches diameter by 7 feet 11 inches long.....
(e) Heating surface (total).....	27 square feet.....	1,920 square feet.....	430 square feet.....	1,454 square feet.....
(f) Grate surface (total).....	27 square feet.....	45.3 square feet.....	16.8 square feet.....	54 square feet.....
19. Working steam pressure.....	150 pounds.....	125 pounds.....	125 pounds.....	120 pounds.....

ATTENDANT PLANT.

Tugs.

20. Name of tug attached to dredge.
21. Owner.
22. Number of crew.

Launches.

23. Name.
24. Number of crew.

Scows.

25. Number of scows in use.
26. Type.
27. Capacity (each).
28. Identifying letter or number.

WORK PERFORMED.

29. Location of dredging.
30. Average depth before dredging.
31. Average depth after dredging.
32. Average width of cut.
33. Total distance cut ahead by dredge, in feet.
34. Total amount dredged in cubic yards during year:
(a) Rock; (1) unit cost.
(b) Sand and mud; (2) unit cost.
35. Average number of cubic yards dredged:
(a) Per day.
(b) Per hour.
36. Maximum number of cubic yards dredged:
(a) In one day.
(b) In one hour.
37. Average number of hours worked per day.
38. Total number of days upon which any dredging was done.
39. Average distance in miles from work to dump.

Venus, Mars, and Vulcan.
United States.
Double crew, 10; single crew, 8.

Fury.
United States.
Double, 17; single, 10.

Wacouts.
1.

4.
8 side pockets, flaring sides.
320 cubic yards.
17, 18, 19, 20.

Wolf River diversion canal and Memphis Harbor.

2.8 miles above St. Paul, Minn.

1.6 feet below low water.
7.4 feet below low water.
38 feet.
21,790.

(b) 173,386 cubic yards; (3) 80,114.

2,020.
260.

1,258.
92.4.

5,007.
455.

8 hours 50 minutes.
143.

2,338.

334.

4.97.

46.

About 1 mile.

Essays.
United States.
b.

None.
Do.

2. Wooden dump.
540 and 535 cubic yards.
11 and 12.

Grand Marais, Mich., and Duluth-Superior.
14 to 20 feet.
18 to 23 feet.
35 feet.
11,700.

(b) 47,709; (2) 24.6.

1,037.
291.

2,338.

334.

4.97.

46.

About 1 mile.

TABLE VI.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916—Continued.*

Name, letter, or number	Cincinnati.				Davenport.				Frankfort.				Galliard, Col. D. D.			
	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
WORK PERFORMED—continued.																
40. Number of scoops loaded during year.																
41. Number of scoops loaded per day.																
42. Average time to load one scoop.																
43. Average time to load one scoop.																
44. Average time to tow lead to dump and return.																
45. Number of scoops per low average percentage.																
46. Character of dredged material and average percentage:																
(a) Mud.																
(b) Rock.																
(c) Sand.																
Distribution of effective working time in hours.																
47. Dredging.																
48. Handling scoops.																
49. Spudding up.																
50. Miscellaneous.																
Distribution of time lost in hours.																
51. Repairing:																
(a) Hull.																
(b) Machinery.																
52. Bad weather.																
53. Changing location of plant.																
54. Delays.																
55. Sundays and holidays.																
56. Out of commission.																
57. Miscellaneous.																
58. Total number of hours in year.	8,784		8,784		8,784		8,784		8,784		8,784		8,784		8,784	1,160

FLOATING PLANT.

4165

COST OF WORK.

Dredge.

50. Pay rolls.....	\$291.87	\$26,700.16	\$2,971.85	
51. Coal.....	118.61	1,467.92	1,578.35	
52. Substenance.....	11.83	1,704.87	701.75	
53. Machinery.....	541.93	277.40	184.92	
54. Miscellaneous.....	40.07	849.75	431.17	
55. Repairs or additions to outfit.....	258.27	284.48	166.06	
56. Ordinary repairs.....				
57. (a) Hull.....		32.17	22.55	
58. (b) Machinery.....		177.04	117.48	
59. (c) Miscellaneous.....		116.60	217.62	
60. Laundry, ice, miscellaneous.....				
61. Total.....	\$11,794.20	\$11,082.23	\$3,161.74	
62. Towboats.....				
63. Operating cost for year.....		8,124.00	5,492.56	
64. Ordinary repairs.....		41.06	282.71	
65. Total.....	80.33	8,175.06	5,605.27	
66. Launch.....				
67. Operating cost for year.....		449.85		
68. Ordinary repairs.....		15.65		
69. Total.....		465.50		
70. Barges and covers.....				
71. Ordinary repairs.....				
72. Total.....	5.68	69.61	(1)	
73. Total field cost.....	\$11,874.73	\$19,772.49	\$11,767.01	
74. Gross cost.....				
75. Office expenses, superintendence, surveys, etc.....				
76. Extraordinary repairs to dredge:				
77. (a) Hull.....		344.61	1,279.98	
78. (b) Machinery.....			7.97	
79. Extraordinary repairs to towboats and launches.....			186.43	
80. Extraordinary repairs to barges and covers.....			(1)	
81. Grand total.....	\$11,874.73	\$20,117.10	\$13,244.39	

TABLE VI.—Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.....	Cincinnati.	Davenport.	Frankfort.	Gallard, Col. D. D.
COST OF WORK—Continued.				
Cost per cubic yard.				
80. Field cost per cubic yard:				
(a) Mud or sand.....	4.11 cents.	\$0.114.		24.6 cents.
(b) Rock.....				
81. Gross cost per cubic yard:				
(a) Mud or sand.....		\$0.116.		27.7 cents.
(b) Rock.....				
MISCELLANEOUS.				
82. Fuel consumed by dredge in long tons				
83. Fuel consumed by auxiliary plant in long tons.	508.54.	463.		380.
	70.	550.		250.
84. Cost per hour of effective working time	\$9.37.	\$10.70.		\$7.27.
85. Cost of fuel per ton.....	\$2.91 and \$2.539.	\$3.17 per long ton.		\$3.45 to \$6.25.
86. Number of days in commission.....	240.	166.		99.
	Remarks.		Remarks.	Remarks.
	<p>¹ Includes contract cost, equipment, office expenses, inspection, etc., complete.</p> <p>² Main boiler has 70 fire tubes, 34 inches diameter, and 20 water tubes, 4 inches diameter.</p> <p>³ The dredge was loaned to Memphis Engineer District during spring, 1916, and was employed throughout remainder of the year in that district.</p> <p>⁴ 206,191 cubic yards was not loaded in scoops but was dumped on banks or in deep water.</p> <p>⁵ Cost included with dredge.</p> <p>⁶ Expenditures in Cincinnati Engineer District. No record of the expenditures in Memphis Engineer District. No record of work performed in Memphis District.</p>		<p>This dredge was employed in the First Cincinnati, Ohio, District during the first 3 months of calendar year, under authority of the Chief of Engineers, dated May 14, 1914 (L. D. 79442). On Apr. 1, 1916, she was sent to Lock 14, Kentucky River, to assist in the completion of this lock and dam on a rental basis to be deducted from amounts due the contractor, the contract for this work having been annulled on Mar. 21, 1916.</p>	<p>The unit cost of dredging is large during the season of 1916 for the following reasons:</p> <p>It will be noted that the dredge worked less than one-half the time. This was due in part to the late delivery of the dredge, necessitating work in exposed location at a time of year when weather conditions are bad in Lake Superior and in part to delays by the contractor in making repairs during the 30-day trial.</p> <p>The scoops chartered, while the best that could be had, were in poor condition and required constant repairs to keep them at all serviceable, with the result</p>

that most of the time the dredge was working with only one scow. Included in the cost of operation for 1915 is the cost of extra cables and other duplicate parts amounting to \$3,000, or 6 cents per yard for the material actually dredged. These extra parts are on hand to avoid delay in case of failure of original parts, but have not as yet been used. All attendant plant included in above cost. No drill boats.
 1. Rented scows used; repairs made by lessee.
 2. Estimated.
 a. Dredge began work Aug. 9, 1915.
 b. \$719.46 dredge; \$560.52 tug.

TABLE VI.—Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter or number.....	Illinois.	Kentucky.	Kent.	Known.
1. District.....	Chicago, Ill.	Chattanooga, Tenn.	Rock Island.....	Milwaukee, Wis.
2. Length.....	98 feet.	100 feet.	110 feet.	100 feet.
3. Beam.....	34 feet.	34 feet.	40 feet.	34 feet.
4. Depth.....	8 feet.	Forward, 6 feet 10 inches; aft, 5 feet 8 inches.	6 feet.	9 feet.
5. Draft:				
(a) Forward.....	4 feet 4 inches.	4 feet.	3 feet 6½ inches.	6 feet 2 inches.
(b) Aft.....	3 feet 4 inches.	3 feet.	3 feet 10 inches.	3 feet 10 inches.
6. Displacement.....	280 tons.	326 long tons.	348 long tons.	442 long tons.
7. Builder:				
(a) Hull and material of hull.....	United States, wood.	Bucyrus Co., material, wood.	Rock Island B. I. & Iron Works.	Steam Shovel Co.; composite.
(b) Machinery.....	Marion-Osgood Co.	Bucyrus Co.	Marion-Osgood Co.	Do.
8. Where built.....	Peoria, Ill.	Paducah, Ky.	Rock Island, Ill.	Milwaukee, Wis.
9. When built.....	1914.	1900; rebuilt 1914 by United States.	1913-14.	1913.
10. Time to build.....	1 year.	Unknown.	1 year.	10 months.
11. Contract cost.....	\$33,600.28.	\$34,300.	\$36,300.	\$47,750.
12. Finished cost with outfit (exclusive of scoops, tugs, and launches).				\$50,000.
13. Bucket:				
(a) Type.....	Bottom dump dipper.	Dipper.	Dipper.	Dipper.
(b) Capacity.....	3 cubic yards.	2 cubic yards rock; 4 cubic yards mud and sand.	2 yards.	Sand, 4 cubic yards; rock, 2 cubic yards.
14. Length of boom.....	44 feet.	45 feet.	45 feet.	45 feet.
15. Maximum dredging depth.....	20 feet.	16 feet.	18 feet.	26 feet.
16. Dimensions of main hoisting-engine cylinders.....	12 inches by 16 inches.	12 inches by 16 inches.	12 by 16 inches.	14 inches by 16 inches.
17. Dimensions of swinging engine.....	8 inches by 8 inches.	8 inches by 10 inches.	8 by 8 inch stroke.	9 inches by 9 inches.
18. Bollers:				
(a) Number.....	1.	1.	1.	1.
(b) Type.....	Locomotive.	Locomotive.	Locomotive fire box.	Scotch marine.
(c) Dimensions.....	66 inches by 20½ feet.	60 inches diameter, 21 feet long.	6 feet 6 inches by 20 feet 6 inches long.	9 feet 6 inches diameter, 16 feet 4 inches long.
(d) Number, diameter, and length of tubes in one boiler.....	110; 3-inch diameter; 13 feet 6 inches long.	88 tubes; 3-inch diameter, 14 feet long.	266; 3-inch flues, 13 feet long.	108; 3½-inch outside diameter; 11 feet 9 inches long.
(e) Heating surface (total).....	1,204 square feet.	985 square feet.	1,620 square feet.	1,420 square feet.
(f) Grate surface (total).....	28 square feet.	22 square feet.	45.3 square feet.	40 square feet.
19. Working steam pressure.....	125 pounds.	125 pounds.	150 pounds.	130 pounds.

ATTENDANT PLANT.

Tugs.

20. Name of tug attached to dredge.....
 21. Owner.....
 22. Number of crew.....

Launches.

23. Name.....
 24. Number of crew.....
 25. Number of scows in use.....

Scows.

26. Type.....
 27. Capacity of each.....
 28. Identifying letter or number.....

WORK PERFORMED.

29. Location of dredging.....
 30. Average depth before dredging.....
 31. Average depth after dredging.....
 32. Average width of cut.....
 33. Total distance cut ahead by dredge, in feet.....
 34. Total amount dredged in cubic yards during year.....
 35. Average number of cubic yards dredged.....
 36. Maximum number of cubic yards dredged.....
 37. Average number of hours worked per day.....
 38. Total number of days upon which any dredging was done.....
 39. Average distance in miles from work to dump.....
 40. Number of scows loaded during year.....

Various.....
 United States.....
 5 to 15.....
 Various.....
 1.....

4.....
 8-cubic side dump.....
 100 cubic yards.....
 13, 14, 15, and 16.....

Upper Mississippi River.....

3 to 4 feet.....
 7 to 8 feet.....
 20 to 40 feet.....
 19,970 feet.....

(a) 125,535 cubic yards; (1) \$0.152 per yard.
 (b) 478,759; (2) 6.7 cents.

712 cubic yards.....
 64 cubic yards.....

1,932 cubic yards.....
 144 cubic yards.....
 10 hours.....
 154 days.....
 1 mile.....
 1,499.....

1,600 rock; 3,500 gravel.....
 200 rock; 450 gravel.....
 15.54.....
 180.....
 1 mile.....
 976.....

Bear Creek, Indian Creek, and Big Bend Shoals and Riverton lock approach.....
 20 inches at low water.....
 5 feet at low water.....
 150 feet.....
 34,241 feet.....

(a) 25,042; (1) 36.9 cents.....
 (b) 61,661; (2) 22.3 cents.....

1,251 rock; 2,200 gravel.....
 175 rock; 350 gravel.....

1,600 rock; 3,500 gravel.....
 200 rock; 450 gravel.....
 15.54.....
 180.....
 1 mile.....
 976.....

Barr in Illinois River.....

41 feet below low water.....
 71 feet below low water.....
 30 feet.....

(a) Rock, (1) Unit cost.....
 (b) 192,794; (2) \$0.134.....

1,230.....
 1824.....

2,046.....
 206.....
 8.....

145.....
 1 mile.....
 1,991.....

Harbors on west shore of Lake Michigan.....

18 feet.....
 22.9 feet.....
 40 feet.....

89,850 feet.....
 (b) 478,759; (2) 6.7 cents.

2,675.....
 222.....

5,980.....
 260.....
 11 hours 58 minutes.....
 179.....
 11 miles.....
 1,799.....

TABLE VI.—Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter or number.....	Illinois.		Kentucky.		Kokub.		Keweenaw.	
	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
WORK PERFORMED—continued.								
41. Number of scoops loaded per day.....			5.4.....		Various.....		94 (average).	
42. Average time to load one scoop.....			30 minutes.....		20 minutes to 2 hours.....		1 hour 20 minutes.	
43. Average load in cubic yards per scoop.....			94% cubic yards.....		70 cubic yards.....		280.	
44. Average time to tow load to dump and return.....			30 minutes.....		1.4 hours.....		55 minutes.	
45. Number of scoops per tow.....			1.....		1 and 2.....		1.	
46. Character of dredged material and average percentage:								
(a) Mud.....	65 per cent.		None.....				50 per cent.	
(b) Rock.....			33 per cent.					
(c) Sand.....	35 per cent.		67 per cent sand and gravel.....				50 per cent.	
Distribution of effective working time in hours.								
47. Dredging.....	1,066	40	2,669		1,338		1,401	1
48. Handling scoops.....			51	40	41		144	8
49. Spudding up.....			57	20			188	20
50. Miscellaneous.....							1,258	10
Distribution of time lost in hours.								
51. Repairs:								
(a) Hull.....	22	40						
(b) Machinery.....	7	15						
52. Bad weather.....	2	30						
53. Changing location of plant.....	185	55	3,108		146		298	2
54. Delays.....	10		18		84		354	18
55. Sundays and holidays.....	1,416		10	25	185		713	10
56. Out of commission.....	3,989		1,440		92		2,064	
57. Miscellaneous.....	2,080		1,311	35	720		672	
58. Total number of hours in year.....	8,784		8,784		8,784		8,784	

FLOATING PLANT.

4171

COST OF WORK.					
<i>Dredge.</i>					
62. Pay rolls.....	\$3,402.88				\$10,947.71
63. (a) Oil.....	706.90				4,358.45
64. (b) Substence.....	645.64				2,200.43
65. (c) Machinery.....	37.57				258.86
66. (d) Miscellaneous.....	193.77				222.60
67. Renewals or additions to outfit.....					
68. Ordinary repairs:					
(a) Hull.....	562.98				887.00
(b) Machinery.....	922.33				1,596.53
(c) Laundry, ice, miscellaneous.....	552.08				200.71
69. Total.....	\$7,144.01	\$12,915.59	\$9,640.64		\$20,489.29
<i>Towboats.</i>					
70. Operating cost per year.....	8,449.20				9,671.77
71. Ordinary repairs.....	842.30				755.74
72. Total.....	9,291.50	7,008.85	7,649.63		10,427.51
<i>Launch.</i>					
73. Operating cost per year.....	135.50				
74. Ordinary repairs.....	6.25				
75. Total.....	141.75	117.45	449.00		
<i>Barges and scows.</i>					
76. Ordinary repairs.....	3,362.25				928.08
77. Total.....	3,362.25	1,265.70	78.48		928.08
78. Total field cost.....	\$19,939.51	\$21,907.59	\$17,517.75		\$31,844.86
<i>Gross cost.</i>					
79. Office expenses, superintendence, surveys, etc.....	4,494.98				1,662.24
80. Extraordinary repairs to dredge:					
(a) Hull.....	326.43				526.51
(b) Machinery.....	345.13				422.57
81. Extraordinary repairs to towboats and launches.....	742.27				
82. Extraordinary repairs to barges and scows.....	25,848.30				
83. Grand total.....		23,080.47	1,352.24		34,868.18

TABLE VI.—Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter or number.....	Illinois.	Kentucky.	Kentuk.	Kewausee.
COST OF WORK—continued.				
Cost per cubic yard.				
80. Field cost per cubic yard:				
(a) Mud or sand.....	\$0.103	21.2 cents; gravel.....	\$0.142	6.7 cents
(b) Rock.....		35.1 cents.....		
81. Gross cost per cubic yard:				
(a) Mud or sand.....	\$0.134	22.3 cents; gravel.....	\$0.152	7.2 cents
(b) Rock.....		38.9 cents.....		
MISCELLANEOUS.				
82. Fuel consumed by dredge in long tons.....	339		407	900
83. Fuel consumed by auxiliary plant in long tons.....	770		676	563
84. Cost per hour of effective working time.....	\$15.29	\$8.28	\$12.89	\$11.37
85. Cost of fuel per ton.....	\$1.50 and 1.72	\$2.617	\$2.64	\$4.35
86. Number of days in commission.....	184	366	185 days of 24 hours each	245
		Remarks.	Remarks.	Remarks.
		Includes repairs to quarter boats. Includes field, Nashville, and Cincinnati office expenses. Drill units 3-8 and 4-8 operations are not included in above costs.	No attendant drill boats. Work performed was removing rock and brush dams, rock and timber cribs, dredging channel, dredging harbors, etc. In commission May 15, 1916, to Nov. 25, 1916, inclusive.	Includes 236 hours pulling piles

Name, letter, or number.....	Revised.	Louisville.	Green River.	Maritz.
1. District.....	Chattanooga, Tenn.	Louisville, Ky.	Louisville, Ky.	First, Cincinnati, Ohio.
2. Length.....	80 feet.	67 feet.	112 feet.	On deck 112 feet.
3. Beam.....	28 feet.	28 feet 6 inches.	31 feet.	34 feet.
4. Depth.....	6 feet 6 inches.	6 feet.	4 feet.	6 feet 10 inches on center line.
5. Draft:				
(a) Forward.....	3 feet 3 inches.	3 feet 4 inches.	2 feet 9 inches.	3 feet.
(b) Aft.....	3 feet.	3 feet.	2 feet 9 inches.	3 feet.
6. Displacement.....	187 long tons.	127 1/2 long tons.	268 long tons.	At 3 feet draft; 267 long tons.
7. Builder:	Osgood Dredge Co., wood.	Burnett & Co., iron.	United States; wood.	Dubuque Boat & Roller Works, steel frames, with Portsmouth iron to above water line.
(a) Hull and material of hull.....				
(b) Machinery.....	Osgood Dredge Co.	Vulcan Iron Works.	The Bucyrus Co.	Dubuque, Iowa.
8. Where built.....	Hull, Knoxville, Tenn.; rebuilt Chattanooga, Tenn.	Cincinnati, Ohio.	Rebuilt; Spotsville, Ky. (hull repaired, 1908).	Bucyrus.
9. When built.....	Rebuilt 1915.	1898.	1898.	1914-15.
10. Time to build.....		4 months.	No record.	19 1/4 months.
11. Contract cost.....	\$11,000.	\$25,000.	\$4,083.69.	\$64,414.
12. Finished cost with outfit (exclusive of scows, tugs, and launches).	\$12,500.	No record.	No record.	\$73,397.83.
13. Bucket:				
(a) Type.....	Dipper.	Dipper.	Dipper.	"Messabi" manganese steel.
(b) Capacity.....	14 cubic yards.	2 cubic yards.	14 cubic yards.	2.5 cubic yards.
14. Length of boom.....	33 feet.	30 feet (crane).	50 feet.	Crane 24 1/2 feet from center.
15. Maximum dredging depth.....	9 feet.	16 feet.	12 feet.	Open channel, 15 feet; harbor, 15 feet.
16. Dimensions of main hoisting-engine cylinders.....	9 feet 10 inches.	Double cylinder, 10 by 15 inches.	8 by 12 inches.	12 by 16 inches.
17. Dimensions of swinging engine.....	5 inches by 6 inches.	18 inches by 8 feet swinging ram.	None.	18 inches diameter, 7.5 feet stroke.
18. Boilers:				
(a) Number.....	1.	1.	1.	1 main, 1 auxiliary.
(b) Type.....	Locomotive.	Scotch marine (water back).	Fire box.	Lyons combined fire and water tube.
(c) Dimensions.....	4 feet by 18 1/2 feet long.	64 feet by 10 feet 7 1/2 inches.	40 inches by 13 feet 6 inches.	80 inches diameter by 14 feet; auxiliary boiler vertical, 42 inches diameter, 7.5 feet high.
(d) Number, diameter, and length of tubes in one boiler.....	56; 3 inches diameter; 12 feet long.	94; 3 inches by 8 feet.	34; 3 inches by 8 feet 6 inches.	81; 2 1/2-inch tubes.
(e) Heating surface (total).....	605.4 square feet.	591 square feet.	376 square feet.	27 square feet.
(f) Grate surface (total).....	17.5 square feet.	17 square feet.	17 square feet.	Main and auxiliary, 150 pounds each.
19. Working steam pressure.....	125 pounds.	135 pounds.	100 pounds.	

TABLE VI.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916—Continued.*

Name, letter, or number.....	Keweenaw.	Louisville.	Green River.	Marquette.
ATTENDANT PLANT.				
<i>Towboats.</i>				
20. Name of tug attached to dredge.....	Hivassae, Ocoee, and Chickamauga.	Cherokee.	Sugaboot Mammoth Cave ¹ .	Cayuga and Ottawa.
21. Owner.....	U. S. Engineer Department.	United States.	United States.	United States.
22. Number of crew.....	Hivassae, 7; Ocoee, 8; Chickamauga, 8.	9.	15.	9.
<i>Launches.</i>				
23. Name.....	Nos. 2 and 3.		Echo River.	None.
24. Number of crew.....	1 each.		1.	
<i>Scows.</i>				
25. Number of scows in use.....	5.	6.	2.	2.
26. Type.....	Side dump.	Bottom dump.	Bottom dump.	Steel; side dump.
27. Capacity (each).....	75 cubic yards.	100 and 150 cubic yards.	200 cubic yards.	125 cubic yards.
28. Identifying letter or number.....	4, 6, 8-B, 14-B, and 17.	17, 18, 19, 20, 21, and 22.	Nos. 1 and 2, G. & B.	9 and 10.
WORK PERFORMED.				
29. Location of dredging.....	Washington Shoals and Sale Creek Shoals.	L. and P. Canal and Dams 41 and 42, Ohio River.	Attoche, 1, 2, and 4, Green River, and bars below Lock 1, Barren River, and at mouth of Rough River.	Ohio River improvement.
30. Average depth before dredging.....	2 feet.	7 feet.	4 feet.	1.5 feet above low water.
31. Average depth after dredging.....	34 feet.	13 feet 3 inches.	9 feet.	2 feet below low water.
32. Average width of cut.....	30 feet.	24 feet 11 inches.	80 feet.	34 feet.
33. Total distance cut ahead by dredge, in feet.....	34,047.	40,110 feet.		30,574.
34. Total amount dredged in cubic yards during year:				
(a) Rock; (1) unit cost.....	(a) 19,417 ¹ .	(a) 800 ¹ ; (1) \$0.097.	(a) 2,300; (1) \$0.1079.	(a) 156.33 tons; (1) 83.30.
(b) Sand and mud; (2) unit cost.....	(b) 60,845.	(b) 136,800 ¹ ; (2) \$0.097.	(b) 20,345; (2) \$0.1079.	(b) 117,667; (2) 80.1767.
35. Average number of cubic yards dredged:				
(a) Per day.....	429.	593.	530.	811.
(b) Per hour.....	36.4.	101.	68.	101.
36. Maximum number of cubic yards dredged:				
(a) In one day.....	1,500.	1,500.	680.	1,874.
(b) In one hour.....	187.	200.	90.	276.
37. Average number of hours worked per day.....	10.52.	7 hours 10 minutes.	90.	8.

38. Total number of days upon which any dredging was done.....	213.	75.	145.
39. A average distance in miles from work to dump.....	1.75.	1.	1.
40. Number of scows loaded during year.....	1,080.	373 scows, 24 barges.	1,072.
41. Number of scows loaded per day.....	3.	45 minutes.	7.
42. Average time to load one scow.....	40 minutes.	45 minutes.	45 minutes.
43. Average load in cubic yards per scow.....	140 (includes barges).	75 cubic yards.	109.7.
44. Average time to tow load to dump and return.....	40 minutes.	45 minutes.	30 minutes.
45. Number of scows per tow.....	1.	1.	1.
46. Character of dredged material and average percentage:			
(a) Mud.....	99.42	92.5 (includes sand and gravel).	5 per cent.
(b) Rock.....	0.58.	7.5.	70 per cent.
(c) Sand.....			20 per cent.

Distribution of effective working time in hours.

	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
47. Dredging.....	1,993					
48. Handling scows.....	156					
49. Spudding up.....	156					
50. Miscellaneous.....	200					
<i>Distribution of time lost in hours.</i>						
51. Repairing:						
(a) Hull.....	16					
(b) Machinery.....	112					
52. Bad weather.....	168					
53. Changing location of plant.....	24					
54. Delays.....	443					
55. Sundays and holidays.....	1,440					
56. Out of commission.....	3,984					
57. Miscellaneous.....	392					
58. Total number of hours in year.....	8,784		8,784		8,784	

TABLE VI.—Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.	Kwasind.	Louisville.	Green River.	Marietta.
COST OF WORK.				
<i>Dredge.</i>				
59. Pay rolls.....	\$5,171.44	\$4,938.27	\$2,462.54	\$6,999.77
60. Coal.....	1,146.06	741.06	208.22	1,260.56
61. Supplies:				
(a) Subsistence.....	2,002.42	166.50		1,297.95
(b) Machinery.....	283.02	64.78	34.30	843.51
(c) Miscellaneous.....	212.87	42.97	166.24	251.10
62. Renewals or additions to outfit.....	1,040.88	944.06	193.60	801.22
63. Ordinary repairs:				
(a) Hull.....	187.75	380.14		
(b) Machinery.....	1,966.80	1,490.46	*298.55	583.02
64. Laundry, ice, miscellaneous.....	37.50	17.66	58.08	166.45
65. Total.....	\$11,968.72	\$8,785.91	\$3,419.49	\$11,706.87
<i>Towboats.</i>				
66. Operating cost for year.....	6,539.45	4,211.05		10,367.72
67. Ordinary repairs.....	1,584.02	579.39		
68. Total.....	8,123.47	4,790.44		10,367.72
<i>Launch.</i>				
69. Operating cost for year.....	245.46			
70. Ordinary repairs.....	17.11			
71. Total.....	262.57			
<i>Barges and scows.</i>				
72. Ordinary repairs.....	818.45	204.59		25.00
73. Total.....	818.45	204.59		25.00
74. Total field cost.....	\$21,173.21	\$13,780.94	\$3,419.49	\$22,094.59

Gross cost.					
75. Office expenses, superintendence, surveys, etc. ¹	1,791.82				108.98
76. Extraordinary repairs to dredge:					138.86
(a) Hull.....					382.96
(b) Machinery.....					
77. Extraordinary repairs to towboats and launches.					41.50
78. Extraordinary repairs to barges and scows.					
79. Grand total.....	22,964.88	\$ 18,780.94	3,419.49		22,768.89
Cost per cubic yard.					
80. Field cost per cubic yard:					
(a) Mud or sand.....	20.3 cents gravel.	\$0.097	\$0.1079	\$0.1767 +	
(b) Rock.....	42.6 to 52.9 cents ¹			8.30.	
81. Gross cost per cubic yard:					
(a) Mud or sand.....	21.9 cents gravel.	\$0.097	\$0.1079	\$0.1820.	
(b) Rock.....	46.2 to 57.4 cents ¹	337	135.	8.55.	
82. Fuel consumed by dredge in long tons.	485.43	532.		482.6.	
83. Fuel consumed by auxiliary plant in long tons.				679.23.	
84. Cost per hour of effective working time	\$10.41	\$4.91	\$1.70	\$22.59.	
85. Cost of fuel per ton.....	\$2.36	\$2.20	240.	\$2.41 +	
86. Number of days in commission.....	363.	250.		245.	
	Remarks.	Remarks.	Remarks.	Remarks.	
	Drill unit No. 1-T operations not included in above costs. ¹ Rock and gravel. ² Includes quarterboat repairs. ³ Includes field, Nashville, and Cincinnati office expenses.	¹ Includes 14,200 cubic yards cast aside. ² \$437.44 of this amount chargeable to work other than dredging.	¹ Not including cost of machinery transferred from old dredge. ² The dredge has no regular tender; it is towed to its place of work by the snagboat Mammoth Cave, after which it and its scows are usually moved by the dredge crew. At times when the snagboat or motor boat Echo River are available for the work, scows are moved by these two boats. ³ A large quantity of the material dredged was cast aside and not moved by scows. The dredge served as drill boat July 6 to Nov. 22, 1916. ⁴ This includes repairs to boom, dipper, stillages, and rigging.	¹ Includes contract cost, equipment, office expense, inspection, etc., complete. ² Main boiler has 68 fire tubes 34 inches diameter, and 14 water tubes, 4 inches diameter.	

TABLE VI — Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.	Maumee.	Notchucky.	Nella River.	Ohio.
1. District.	Cleveland, Ohio.	Chattanooga, Tenn.	Louisville, Ky.	First, Cincinnati, Ohio.
2. Length.	100 feet.	84 feet 10 inches.	88 feet 8 inches.	110 feet (over all, 112 feet).
3. Beam.	36 feet 2½ inches.	30 feet.	30 feet 8 inches.	31 feet 6 inches.
4. Depth.	11 feet.	6 feet 9 inches.	6 feet 8 inches.	6 feet 8 inches.
5. Draft:				
(a) Forward.	7 feet 8 inches.	3 feet 5 inches.	4 feet.	2 feet 11 inches.
(b) Aft.	2 feet 9½ inches.	3 feet 4 inches.	2 feet 6 inches.	2 feet 11 inches.
6. Displacement.	549 tons.	211 tons.	210 long tons.	270 tons.
7. Builder:				
(a) Hull and material of hull.	Miller & Murphy; rebuilt by Toledo Shipbuilding Co., Albany, N. Y.	U. S. Engineer Department; The Marion-Osgood Co.	The Dravo Contracting Co.; steel.	Allen & Blaisdell, 1873; remodeled, iron, 1880.
(b) Machinery.	Osgood Dredge Co., Albany, N. Y.	Muscle Shoals Canal, Ala.	The Marion Steam Shovel Co.	American Dredge Co.
8. Where built.	Rebuilt at Toledo, Ohio.	1913.	Hull, Pittsburgh, Pa.; house, Louisville, Ky.	Hull, St. Louis, Mo.
9. When built.	1884; rebuilt in 1909.		Hull, 1915; house, 1916.	Original hull wood, 1873; present hull iron, 1880.
10. Time to build.	Unknown.	129 days.	7 months.	About 1 year.
11. Contract cost.	\$42,000.	\$11,604 (machinery).	\$9,375 (hull).	\$21,850.
12. Finished cost with outfit (exclusive of scows, tugs, and launches).	\$42,000.	\$27,011.65.	\$28,814.05.	About \$35,000.
13. Bucket:				
(a) Type.	Bottom-dump dipper.	Dipper.	Dipper.	Dipper.
(b) Capacity.	5 cubic yards.	14 cubic yards.	14 cubic yards.	2.7 cubic yards.
14. Length of boom.	42.4 feet.	36 feet.	40 feet.	Crane 24 feet from center.
15. Maximum dredging depth.	26 feet.	14 feet.	15 feet.	Open channel, 15 feet; harbor, 18 feet.
16. Dimensions of main hoisting-engine cylinders.	2 cylinders, 14 by 20 inches.	81 by 10 inches.	9 by 11 inches.	12 by 15 inches.
17. Dimensions of swinging engine cylinders.	2 cylinders, 8 by 10 inches.	5 by 6 inches.	6 by 7 inches.	16 inches by 8 feet 4 inches.
18. Boilers:				
(a) Number.	2.	1.	1.	1.
(b) Type.	Locomotive.	Locomotive.	Scotch marine.	Roberts water tube.
(c) Dimensions.	19 feet by 4 feet 8 inches.	19 feet by 18 feet.	6 feet 5 inches by 11 feet 4 inches.	9 by 7 feet 3 inches by 9 feet 7 inches.
(d) Number, diameter, and length of tubes in one boiler.	120; 3 inches by 12 feet.	54; 3 inches diameter by 11½ feet long.	75; 3 inches by 9 feet 10½ inches.	11, 14, and 2½ inch diameter pipe.
(e) Heating surface (total).	1,299 square feet.	585 square feet.	16.5 feet.	42.8 square feet.
(f) Grate surface (total).	40 square feet.	120 pounds.	125 pounds.	135 pounds.
19. Working steam pressure.	80 pounds.			

ATTENDANT PLANT.

Towboats.

20. Name of tug attached to dredge.
21. Owner.
22. Number of crew.

Spear,
United States.
6.

Hilwasee and Chikamauga,
U. S. Engineer Department.
Hilwasee, 6 single; Chikamauga, 7.

(9).
8.

Miami and Cayuga,
United States.
9.

Launches.

23. Name.
24. Number of crew.

Nos. 2 and 3.
1 each.

Mignon.
None.

Scows.

25. Number of scows in use.
26. Type.
27. Capacity (each).
28. Identifying letter or number.

1.
Side dump.
15 cubic yards each.
Nos. 4, 6, 8-R, 14-R, and 17.

2.
Bottom dump.
100 cubic yards.
Nos. 1 and 2, G. & B.

2.
Steel, slide dump.
125 cubic yards.
Nos. 5 and 7.

WORK PERFORMED.

29. Location of dredging.

Locks Nos. 2, 4, and 5, Green River, No. 1, Barren River, at bars; and at Dam No. 43, Ohio River.

Ohio River improvement.

30. Average depth before dredging.
31. Average depth after dredging.
32. Average width of cut.
33. Total distance cut ahead by dredge, in feet.

Washington-Headeridge Sale Creek and Coulter Island Shoals.
2 feet and 1½ feet.
34 feet.
30 feet.
10,500 feet.

4 feet 6 inches.
8 feet.
36 feet.

2.5 feet above low water.
2.5 feet below low water.
32 feet.
26,887 feet.

TABLE VI.—Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.....	Assumee.		Notchuck.	Nodda River.	Ohio.
	Conneaut.	Cleveland.			
		District.			
WORK PERFORMED—continued.					
34. Total amount dredged in cubic yards during year: (a) Rock; (1) unit cost..... (b) Sand and mud; (2) unit cost.....	(a) 10,680; (1) \$0.75. (b) 44,196; (2) \$0.225.		(a) 22,218; (1) 27.6 cents. (b) 26,365 gravel; (2) 31.7 cents.	(a) 12,590. (b) 35,075+; (2) \$0.0675.	(a) 135.6 tons; (1) \$7.28+. (b) 166,967; (2) \$0.1528+.
35. Average number of cubic yards dredged: (a) Per day..... (b) Per hour.....	466..... 58.....	986..... 73.....	415..... 49.2.....	225, rock; 400 mud and gravel..... 30, rock; 75 mud and gravel.....	1,083. 135.
36. Maximum number of cubic yards dredged: (a) In one day..... (b) In one hour.....	1,500..... 238.....	1,430..... 179.....	825 and 450.1..... 103 and 58.26.....	650..... 126.....	2,100. 300.
37. Average number of hours worked per day.....	5.6.....	5.2.....	844 worked 2 shifts for short time. 117.....	8..... 133.....	8. 154.
38. Total number of days upon which any dredging was done.....	86.....	17.....	103.....	1.....	1.
39. Average distance in miles from work to dump.....	1.5.....	0.5.....	1.....	1 mile and part was casted.....	1.
40. Number of scows loaded during year.....	103.....	35.....	138.....	175 where not casted.....	1,412.
41. Number of scows loaded per day.....	1.2.....	2.....	1.34.....	4 where not casted.....	9.
42. Average time to load one scow.....	5 hours 21 minutes.....	3 hours 13 minutes.....	4 hours 8 minutes.....	35 minutes.....	35 minutes.
43. Average load in cubic yards per scow.....	390.....	421.....	368.....	70.....	111.
44. Average time to tow load to dump and return.....	53 minutes.....	30 minutes.....	40 minutes.....	45 minutes.....	30 minutes.
45. Number of scows per tow.....	1.....	1.....	1.....	1.....	1.
46. Character of dredged material and average percentage: (a) Mud..... (b) Rock..... (c) Sand.....	100..... 26.5..... 73.5.....	80.6..... 19.4..... 73.5.....	28.6 rock and gravel..... 17.1..... 54.3 gravel.....	26.4..... 73.6.....	10 per cent. 70 per cent. 20 per cent.

	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
Distribution of effective working time in hours.										
47. Dredging.....	643	30	916		880		981		8	
48. Handling coals.....	31		21		31		1		40	
49. Spudding up.....	13		20		50					
50. Miscellaneous.....	186	40	30		70		94		38	
Distribution of time lost in hours.										
51. Repairs:										
(a) Hull.....			172							
(b) Machinery.....			173		48		314		15	
52. Bad weather.....	49		574		268		201		10	
53. Changing location of plant.....	24	20	28		16		139		15	
54. Delays.....	121	10	43		820		884			
55. Sundays and holidays.....	720		1,440		4,033		5,524			
56. Breakdowns.....	(3)		5,132							
57. Miscellaneous.....	2,459	30	248							
Total number of hours in year.....	4,416		8,784		8,784		8,784			
COST OF WORK.										
Dredge.										
59. Pay rolls.....	\$6,469.49		\$4,418.97		\$2,438.73		\$8,226.28			
60. Coal.....	1,441.64		642.83		263.43		1,188.79			
61. Supplies:										
(a) Substance.....	1,240.17		1,288.43		19.77		1,819.38			
(b) Machinery.....	498.75		9.28		119.85		703.78			
(c) Miscellaneous.....	264.02		1,389.39		220.67		163.68			
62. Renewals or additions to outfit.....	3,241.28						203.87			
63. Ordinary repairs:										
(a) Hull.....			46.73				307.88			
(b) Machinery.....	35.70		3,327.94		62.69		573.52			
64. Laundry, ice, miscellaneous.....	513.38		37.50		63.94		193.05			
Total.....	\$13,006.63		\$11,081.07		\$3,219.06		\$13,238.53			
Tugsboats.										
65. Operating cost for year.....	4,203.98		2,378.75				1,983.10			
67. Ordinary repairs.....			227.50				11,106.11			
Total.....	4,203.98						264.60			
Total.....			2,504.25				13,238.71			

TABLE VI.—Report of operations of shipper dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.....	Maumee.		Notchuck.	Nott's River.	Ohio.
	Con- neut.	Cleve- land.			
COST OF WORK—continued.					
Launch.					
69. Operating cost for year.....			\$62.98		\$24.00
70. Ordinary repairs.....			4.39		17.00
71. Total.....			\$67.37		\$41.00
Barges and scows.					
72. Ordinary repairs.....			\$ 428.95		
73. Total.....			428.95		
74. Total field cost.....			\$18,004.61	\$3,219.06	\$26,495.24
Gross cost.					
75. Office expenses, superintendence, surveys, etc.....			1,500.00		104.31
76. Extraordinary repairs to dredge: (a) Hull.....					352.99
(b) Machinery.....			530.88		6,002.07
77. Extraordinary repairs to towboats and launches.....					38.40
78. Extraordinary repairs to barges and scows.....					33,493.01
79. Grand total.....			20,035.49	3,219.06	
Cost per cubic yard.					
80. Field cost per cubic yard:		District.			
(a) Mud or sand.....	\$0.224	\$0.227	34.4 cents gravel and 25.7	\$0.0875	\$80.1528+
(b) Rock.....	.755	.755	28.6 cents.....		(87.28+)
81. Gross cost per cubic yard:					
(a) Mud or sand.....	.249	.253	27.7 gravel and 28.2	\$0.0875	\$80.1982+
(b) Rock.....	.689	.689	31.9 cents.....		(88.203+)

MISCELLANEOUS.

82. Fuel consumed by dredge in long tons.	461.	198. 36.	102.	498. 7.
83. Fuel consumed by auxiliary plant in long tons.	260.			1,183.5.
84. Cost per hour of effective working time.	\$21.08.	\$16.		\$31.67+.
85. Cost of fuel per ton.	\$2.75 to \$3.	\$2.757.	\$1.80.	\$2.24+.
86. Number of days in commission.	172.	261.	198.	242.
<p><i>Remarks.</i></p> <p>¹ The rock removed at Conneaut Harbor consisted in the tearing out of rock-filled timber crib breakwater and removing riprap and timber crib pierhead with concrete superstructure.</p> <p>² The dredge was in commission during the whole period. During the period when navigation was closed by ice the crew were overhauling machinery and making necessary repairs.</p> <p>³ This item includes 264 hours when operation of the dredge was prevented by ice.</p>				
<p><i>Remarks.</i></p> <p>Drill unit 1-T and drill unit No. 36, but their operations are not included in above costs. While at Coulter Island Shoals no dump scows or launches were used, material being casted to side of channel.</p> <p>¹ Dredge was in charge of two different assistants and the two sets of figures are as reported separately by them.</p> <p>² Includes "quarterboat" repairs.</p> <p>³ Includes field, Nashville and Cincinnati office expenses.</p>				
<p><i>Remarks.</i></p> <p>¹ House and machinery installed by the United States.</p> <p>² This dredge has no regular tender. It is towed to its place of work by snagboat Mammoth Cave, after which, if the snagboat or the motorboat Echo River are not available, it and its scows are moved by hand. A large quantity of the material dredged was cast aside and not moved by scows.</p> <p>³ 704 logs were also removed.</p> <p>⁴ Mud, sand, and gravel.</p> <p>⁵ Not placed in commission until June 17.</p>				

TABLE VI.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916—Continued.*

Name, letter, or number.	Onago.	Phoenix.	Ravenwood. ¹	Series.
1. District.	First, Cincinnati, Ohio.	St. Louis, Mo.	Wheeling, W. Va.	Nashville.
2. Length.	92 feet (over all, 94 feet).	80 feet.	80 feet.	80 feet.
3. Beam.	31 feet (over all, 34 feet).	30 feet.	30 feet, 6 inches (34 feet over all).	30 feet.
4. Depth.	6 feet 1 inch.	8 feet.	6 feet 6 inches.	7 feet.
5. Draft:				
(a) Forward.	3 feet 3 inches.	4 feet.	4 feet.	2 feet 6 inches.
(b) Aft.	3 feet 3 inches.	2 feet 6 inches.	3 feet.	3 feet 11 inches.
6. Displacement.	235 tons.	158 tons.	238 tons.	200 tons.
7. Builder:				
(a) Hull and material of hull.	Allen & Blaisdell; new bottom plating, 1909.	A. Cutting; wood.	McKeesport Saw Mill Co.; wood.	Featherstone Foundry & Machine Co.
(b) Machinery.	Original Vulcan Iron Works, New York; remodeled 1899.	A. Cutting.	Bucyrus Co.	Do.
8. Where built.	St. Louis, Mo.	Metropolis, Ill.	McKeesport, Pa.	Jeffersonville, Ind.
9. When built.	1883.	1885.	1902.	1903.
10. Time to build.	6 months.	9 months.	5 months.	8 months.
11. Contract cost.	\$19,750 (hull).	\$16,600.	\$18,650.	\$18,650.
12. Finished cost with outfit (exclusive of scows, tugs, and launches).	About \$25,000.	\$19,525.	\$23,000.	\$18,900.
13. Bucket:				
(a) Type.	Dipper.	Dipper.	Dipper.	Dipper.
(b) Capacity.	2,7 cubic yards.	14 cubic yards.	24 cubic yards.	14 cubic yards.
14. Length of boom.	(Range 23.75 feet from center.	24 feet.	40 feet.	45 feet.
15. Maximum dredging depth.	15 feet open channel; 18 feet harbor.	17 feet.	21 feet.	19 feet.
16. Dimensions of main hoisting-engine cylinders.	12 by 15 inches.	12 by 18 inches.	12 by 14 inches.	8-inch bore, 12-inch stroke.
17. Dimensions of swinging engine.	16 inches by 8 feet 4 inches.	7 by 10 inches.	7 by 7 inches.	6-inch bore, 10-inch stroke.
18. Rollers:				
(a) Number.	1.	1.	1.	1.
(b) Type.	Roberts water tube.	Firebox.	Horizontal, fire-box tube.	Locomotive.
(c) Dimensions.	6 feet 9 inches by 10 feet 3 inches by 10 feet high.	18 feet 10 inches by 5 feet.	4 feet diameter, 16 feet 9 inches long.	42 inches by 12 feet 6 inches.
(d) Number, diameter, and length of tubes in one boiler.	56; 3 inches diameter, 10 feet long.	86; 3 inches diameter, 10 feet long.	54; 3 inches; 11 feet 6 inches long.	54; tubes, 24 inches by 7 feet 3 inches.
(e) Heating surface (total).	1,075 square feet.	1,075 square feet.	534 square feet.	283 square feet.
(f) Grate surface (total).	45.33 square feet.	22 square feet.	171 square feet.	10.4 square feet.
19. Working steam pressure.	135 pounds.	100 pounds.	100 pounds.	100 pounds.
ATTENDANT PLANT.				
Tugboats.				
20. Name of tug attached to dredge.	Guyandot, and Cayuga.	None.	Crozet.	U. S. S. Henry.
21. Owner.	United States.	United States.	United States.	U. S. Engineer Department.
22. Number of crew.	9.	7.	7.	7.

<i>Launches.</i>					
23. Name.....	None.....	None.....	None used.....		
24. Number of crew.....					
<i>Scows.</i>					
25. Number of scows in use.....	2.....	2.....	2.....	2.....	2.....
26. Type.....	Steel, side dump.....	Steel, side dump.....	Side dump (wood).....	Side dump.....	Side dump.....
27. Capacity (each).....	125 cubic yards.....	125 cubic yards.....	125 cubic yards.....	125 cubic yards.....	125 cubic yards.....
28. Identifying letter or number.....	6 and 8.....	6 and 8.....	U. S. K. D. Wheeling, Nos. 41 and 42.....	U. S. K. D. Wheeling, Nos. 41 and 42.....	U. S. K. D. Wheeling, Nos. 41 and 42.....
WORK PERFORMED.					
29. Location of dredging.....	Ohio River improvement.....	Ohio River improvement.....	At and near Dam No. 21, Ohio River.....	At and near Dam No. 21, Ohio River.....	Cumberland River.....
30. Average depth before dredging.....	4 feet above low water.....	4 feet above low water.....	5 feet above low water.....	5 feet above low water.....	5 feet above low water.....
31. Average depth after dredging.....	5 feet below low water.....	5 feet below low water.....	5 feet below low water.....	5 feet below low water.....	5 feet below low water.....
32. Average width of cut.....	32 feet.....	32 feet.....	32 feet.....	32 feet.....	32 feet.....
33. Total distance cut ahead by dredge, in feet.....	17,094.....	17,094.....	17,094.....	17,094.....	17,094.....
34. Total amount dredged in cubic yards during year.....	(a) 237.6 tons; (1) \$4.26+.....	(a) 237.6 tons; (1) \$4.26+.....	(a) None.....	(a) None.....	(a) None.....
(a) Rock and snags; (1) unit cost.....	(b) 156,918 cubic yards; (2) \$0.1231+.....	(b) 156,918 cubic yards; (2) \$0.1231+.....	(b) 179,900 (gravel); 9 cents.....	(b) 179,900 (gravel); 9 cents.....	(b) 29,770 (2) 27 cents.....
(b) Sand and mud and gravel; (2) unit cost.....					
35. Average number of cubic yards dredged.....	1,145.....	1,145.....	1,025.....	1,025.....	291.....
(a) Per day.....	143.....	143.....	130.....	130.....	364.....
(b) Per hour.....					
36. Maximum number of cubic yards dredged.....	2,250.....	2,250.....	1,800.....	1,800.....	560.....
(a) In one day.....	390.....	390.....	225.....	225.....	80.....
(b) In one hour.....	8.....	8.....	8.3.....	8.3.....	8.....
37. Average number of hours worked per day.....	163.....	163.....	166.....	166.....	102.....
38. Total number of days upon which any dredging was done.....	1.....	1.....	1 to 1/2 mile.....	1 to 1/2 mile.....	1.....
39. Average distance in miles from work to dump.....	1,602.....	1,602.....	1,709.....	1,709.....	372.....
40. Number of scows loaded during year.....	10.....	10.....	10.....	10.....	372.....
41. Number of scows loaded per day.....	30 minutes.....	30 minutes.....	45 minutes.....	45 minutes.....	314.....
42. Average time to load one scow.....	116.....	116.....	100.....	100.....	1 hour.....
43. Average load in cubic yards per scow.....	30 minutes.....	30 minutes.....	25 minutes.....	25 minutes.....	80.....
44. Average time to tow load to dump and return.....	1.....	1.....	1.....	1.....	1 hour 20 minutes.....
45. Number of scows per tow.....					
46. Character of dredged material and average percentage:					
(a) Mud.....	15 per cent.....	15 per cent.....	10 per cent.....	10 per cent.....	59.92.....
(b) Rock and gravel.....	65 per cent.....	65 per cent.....	60 per cent (gravel).....	60 per cent (gravel).....	30.....
(c) Sand.....	20 per cent.....	20 per cent.....	30 per cent.....	30 per cent.....	40.08.....

TABLE VI.—Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.	Oswego.		Phoenix.		Rattenswood.		Saler.	
	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
WORK PERFORMED—continued.								
<i>Distribution of effective working time in hours.</i>								
47. Dredging.....	837	25			998		818	
48. Handling scows.....	3	45			232		62	
49. Spudding up.....					100		31	
50. Miscellaneous.....	110	5					240	
<i>Distribution of time lost in hours.</i>								
51. Repairing:								
(a) Hull.....								
(b) Machinery.....	167	45			178		72	
52. Bad weather.....	187				512		456	
53. Changing location of plant.....	353	10			32		72	
54. Delays.....	226	50					40	
55. Sundays and holidays.....	838				334		804	
56. Out of commission.....	5,980				544		6,342	
57. Miscellaneous.....					5,808		149	
58. Total number of hours in year.....	8,794		8,794		8,794		8,794	
COST OF WORK.								
<i>Dredge.</i>								
59. Pay rolls.....	\$7,730.10				\$7,030.28		\$2,353.39	
60. Coal.....	944.64				1,806.06		191.32	
61. Supplies:								
(a) Subsistence.....	1,183.68						363.91	
(b) Machinery.....	488.80				492.15		10.00	
(c) Miscellaneous.....	122.90				1,012.15		337.38	
62. Repairs or additions to outfit.....	368.04							
63. Ordinary repairs:								
(a) Hull.....	125.82		123.69		493.45		31.18	
(b) Machinery.....	413.12		560.13		2,777.94			
(c) Miscellaneous.....	148.57				147.31			
64. Laundry, ice, miscellaneous.....								
65. Total.....	\$11,587.75		\$938.72		\$12,168.34		\$3,267.18	

	Towboats.	Barges and scows.	MISCELLANEOUS.
66.	Operating cost for year..... 12,246.43		
67.	Ordinary repairs..... 824.71		
68.	Total..... 12,571.14		
	Launch.		
69.	Operating cost for year.....		
70.	Ordinary repairs.....		
71.	Total.....		
	Barges and scows.		
72.	Ordinary repairs.....		
73.	Total.....		
74.	Total field cost..... \$24,158.89		
	Gross cost.		
75.	Office expenses, superintendence, surveys, etc.....	68.56	
76.	Extraordinary repairs to dredge: (a) Machinery..... (b) Hull.....	1,116.75 5,942.64	
77.	Extraordinary repairs to towboats and launches.....	38.40	
78.	Extraordinary repairs to barges and scows.....		
79.	Grand total..... Cost per cubic yard.....	31,325.24	
80.	Filled cost per cubic yard: (a) Mud or sand..... (b) Rock.....	\$0.1221 + (and gravel) \$.26 + (and snags per ton)	28 cents.
81.	Gross cost per cubic yard: (a) Mud or sand..... (b) Rock.....	0.1589+ cents (and gravel) \$.644 (and snags per ton)	9 cents (gravel).
82.	Fuel consumed by dredge, in long tons.....	368.8+	824.
83.	Fuel consumed by auxiliary plant, in long tons.....	1,025.2+	102.
84.	Cost per hour of effective working time.....	\$32.93+	\$6.79.

TABLE VI.—Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.	Osego.	Phoenix.	Ravenwood.	Sander.
MISCELLANEOUS—continued.				
85. Cost of fuel per ton.	\$2.94 +	Not in commission during year.	\$2.57	\$1.60.
86. Number of days in commission.	249.		304.	102.
		<i>Remarks.</i> Purchased from Rock Island (Ill.) District in November, 1916.	<i>Remarks.</i> No attendant drill boats. This plant was employed in construction of Dam No. 21, Ohio River. : Formerly Southern. : See report for Crozet. : None.	

Name, letter, or number.....	Sodus.	St. Paul.	Tellco.	Tennessee.
1. District.....	Buffalo, N. Y.....	Rock Island, Ill.....	Chattanooga, Tenn.....	Chattanooga, Tenn.....
2. Length.....	100 feet.....	110 feet.....	80 feet.....	100 feet.....
3. Beam.....	33 feet.....	49 feet.....	30 feet.....	34 feet.....
4. Depth.....	Forward, 9 feet 8 inches; aft, 8 feet 9 inches.....	6 feet.....	7 feet.....	6 feet 10 inches.....
5. Draft:				
(a) Forward.....	5 feet 2 inches.....	3 feet 6 inches.....	3 feet.....	5 feet 3/4 inches.....
(b) Aft.....	2 feet.....	2 feet 10 1/2 inches.....	2 feet 6 inches.....	3 feet 4 inches.....
6. Displacement.....	375 net tons.....	348 tons.....	170 long tons.....	390 tons.....
7. Builder:				
(a) Hull and material of hull.....	U. S. Engineer Department, wood.....	Rock Island Bridge and Iron Works.....	Marion-Osgood Co., wood.....	U. S. Engineer Department, wood.....
(b) Machinery.....	Marion Steam Shovel Co.....	Marion-Osgood Co.....	Marion-Osgood Co.....	Bucyrus Co.....
8. Where built.....	Oswego, N. Y.....	Moline, Ill.....	Hull, Knoxville, Tenn.; machinery, Marion, Ohio.....	Hull, Muscle Shoals Canal, Ala.....
9. When built.....	December, 1910, to April, 1912.....	1913-14.....	May, 1912.....	1910.....
10. Time to build.....	17 months.....	9 months.....	8 months.....	9 months.....
11. Contract cost.....	Hull, \$20,245.....	Hull, \$23,612.52.....	\$16,248.....	\$19,850, machinery.....
12. Finished cost with outfit (exclusive of masts, tugs, and launches).	\$36,000.....	\$56,130.56.....	\$18,248.....	\$37,513.....
13. Bucket:				
(a) Type.....	Dipper (2).....	Dipper.....	Dipper.....	Dipper.....
(b) Capacity.....	One 4 1/2 cubic yards; one 3.22 cubic yards.....	2 cubic yards.....	1 1/2 cubic yards.....	1 1/2 cubic yards rock; 2 cubic yards mud, etc.....
14. Length of boom.....	46 feet 6 inches.....	45 feet.....	35 feet.....	45 feet.....
15. Maximum dredging depth.....	26 feet.....	15 feet.....	14 feet.....	16 feet.....
16. Dimensions of main hoisting-engine cylinders.....	14 by 26 inches.....	12 by 16 inches.....	8 1/2 by 10 inches.....	10 by 14 inches.....
17. Dimensions of swinging engine.....	8 by 8 inches.....	8 by 8 inches.....	5 by 6 inches.....	
18. Rollers:				
(a) Number.....	1.....	1.....	1.....	1.....
(b) Type.....	Horizontal fire tube.....	Locomotive.....	Locomotive.....	Locomotive fire tube.....
(c) Dimensions.....	11 feet 8 inches long by 74 inches wide.....	20 feet 6 inches long, 6 feet 6 inches diameter.....	18 inches diameter, 18 feet 6 inches long.....	66 inches diameter, 18 feet 6 inches long.....
(d) Number, diameter, and length of tubes in one boiler.....	130; 3 inches diameter, 9 feet long.....	225; 2 inches diameter, 13 feet long.....	54; 3 inches diameter, 11 feet 6 inches long.....	112; 3 inches diameter, 13 feet long.....
(e) Heating surface (total).....	1,142 square feet.....	1,020 square feet.....	612.04 square feet.....	1,500 square feet.....
(f) Grate surface (total).....	34.66 square feet.....	45.5 square feet.....	18 square feet.....	25 square feet.....
19. Working steam pressure.....	110 pounds.....	150 pounds.....	125 pounds.....	125 pounds.....
ATTENDANT PLANT.				
Towboats.				
20. Name of tug attached to dredge.....	Brewerton.....	Le Claire, Grace, and Ruth intermittently.....	Chilhowee.....	Lookout and King.....
21. Owner.....	United States.....	United States.....	U. S. Engineer Department.....	U. S. Engineer Department.....
22. Number of crew.....	4.....	Grace and Ruth, 6 each; Le Claire, 11.....	6 on each shift.....	Lookout, 3 to each shift; King.....

TABLE VI.—Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.	Sodus.	St. Paul.	Tellco.	Tennessee.
ATTENDANT PLANT—continued.				
<i>Launches.</i>				
23. Name.			No. 4.	No. 7.
24. Number of crew.			2.	1.
<i>Scows.</i>				
25. Number of scows in use.	2.	8.	2.	3.
26. Type.	Pump.	Flat.	Side dump.	Side dump.
27. Capacity (each).	210 cubic yards.	100 tons.	150 tons.	225 cubic yards.
28. Identifying letter or number.	Nos. 13 and 16.	Nos. 283, 287, 288, 290, 191, 292, 298, 299.	14 and 15.	Nos. 6, 7, and 16.
WORK PERFORMED.				
29. Location of dredging.	Charlotte, Great Sodus, Little Sodus, Oswego Harbors.	Rock Island Rapids, Le Claire Canal.	Lyons and Williams Shoals.	Kogers Island.
30. Average depth before dredging.	Charlotte, 16½ feet; Great Sodus, 13 feet; Little Sodus, 14 feet; Oswego, 13½ feet.	2½ feet below low water.	1½ feet.	4½ feet.
31. Average depth after dredging.	Charlotte, 21 feet; Great Sodus, 15 feet; Little Sodus, 15½ feet; Oswego, 15½ feet.	7 feet below low water.	3½ feet.	6 feet.
32. Average width of cut.	40 feet.	20 feet.	30 feet.	37½ feet.
33. Total distance cut ahead by dredge, in feet.	28,503.		30,270.	26,640.
34. Total amount dredged in cubic yards during year.				
(a) Rock; (1) unit cost.	(a) 400; (1) \$0.219.	(a) 14,807 (solid barge displacement); (1) \$1.34.	(a) 9,909; (1) \$1.08.	(a) 21,005; (1) \$1.19.
(b) Sand and mud; (2) unit cost.	(b) 151,322; (2) \$0.125.	(b) 3,773 (solid barge displacement); (2) \$0.89.	(b) 33,192 gravel; (2) \$0.305.	
35. Average number of cubic yards dredged:				
(a) Per day.	1,176.49.	250 mud, 210 rock (barge displacement).	184.	111.
(b) Per hour.	187.6.	30 mud, 26 rock (barge displacement).	9.6.	13.6.
36. Maximum number of cubic yards dredged:				
(a) In one day.	1,933.	400 mud, 444 rock (barge displacement).	350.	380.
(b) In one hour.	241.5.	50 mud, 55 rock (barge displacement).	80.	52.

37. Average number of hours worked per day.	6.95	8	15.55	8.25
38. Total number of days upon which any dredging was done.	129	105 rock, 12 sand	261	190
39. Average distance in miles from work to dump.	3	1 1/2	1	1
40. Number of scoops loaded during year.	661 1/2	395 rock, 49 mud	500	494
41. Number of scoops loaded per day.	5 1/4	6 average in rock, 6 average in mud	1.78	2.5
42. Average time to load one scoop.	1 hour 13 minutes	1 hour in rock, 1 hour average in mud	4 1/2 hours	2 1/2 hours
43. Average load in cubic yards per scoop.	230	35 in rock (solid), 80 in mud	60	40
44. Average time to tow load to dump and return.	45 minutes	1 hour in rock, 1 hour in mud	1 hour	1 hour 20 minutes
45. Number of scoops per tow.	1	1 to 2	1	1
46. Character of dredged material and average percentage:	49.75			
(a) Mud	0.25	100	23.1	100
(b) Rock	50	95	76.9 gravel	
(c) Sand				
Distribution of effective working time, in hours.				
47. Dredging	808	45		
48. Handling scoops	55		3,525	1,354
49. Spudding up	71		521	114
50. Miscellaneous	98		426	40
			553	60
Distribution of time lost, in hours.				
51. Repairing:				
(a) Hull	91		172	124
(b) Machinery	117	15	310	32
52. Bad weather	84	30	20	986
53. Changing location of plant.	54	53	53	20
54. Delays	54	30	286	46
55. Sundays and holidays	1,440		1,440	1,440
56. Out of commission	5,884	3,672	2,031	4,644
57. Miscellaneous	53	2,714		14
58. Total number of hours in year.	8,784	8,780	8,784	8,784

TABLE VI.—Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.....	St. Paul.	Tulsa.	Tennessee.
COST OF WORK.			
<i>Dredge.</i>			
59. Pay rolls.....	\$4,390.00	\$5,905.71	\$4,005.95
60. Coal.....	1,496.47	1,366.40	1,950.00
61. Supplies:			
(a) Substance.....	933.53	1,945.29	1,040.75
(b) Machinery.....	901.46	528.91	520.40
(c) Miscellaneous.....	150.97	140.37	333.45
62. Renewals or additions to outfit.....	3,474.19		
63. Ordinary repairs:			
(a) Hull.....	500.03	490.75	1,990.40
(b) Machinery.....	926.46	1,791.85	2,575.27
64. Laundry, ice, miscellaneous.....	349.39	7.00	213.00
65. Total.....	\$13,080.50	\$13,034.40	\$13,467.28
<i>Towboat.</i>			
66. Operating cost for year.....	4,561.51	7,427.75	5,495.00
67. Ordinary repairs.....	1,342.04	506.94	1,798.80
68. Total.....	5,903.55	7,934.72	7,293.80
<i>Launch.</i>			
69. Operating cost for year.....			38.60
70. Ordinary repairs.....			44.00
71. Total.....		1,141.43	82.60
<i>Barges and scows.</i>			
72. Ordinary repairs.....	459.41	1,798.00	1,554.71
73. Total.....	459.41	798.00	2,554.71
74. Total field cost.....	\$18,994.05	\$21,578.45	\$23,431.09
<i>Gross cost.</i>			
75. Office expenses, superintendence, surveys, etc.....	900.00	1,247.05	1,629.60

76. Extraordinary repairs to dredge: (a) Hull..... (b) Machinery.....					
77. Extraordinary repairs to towboats and launches.....					
78. Extraordinary repairs to barges and scows.....					
79. Grand total.....	19,864.06	24,144.84	23,225.00	25,060.00	
Cost per cubic yard.					
80. Field cost per cubic yard: (a) Mud or sand..... (b) Rock.....	\$0.125 \$0.219	\$0.50 \$1.34	\$0.373 gravel \$0.868 and \$1.144	\$1.11.	
81. Gross cost per cubic yard: (a) Mud or sand..... (b) Rock.....	\$0.1308 \$0.253	\$0.95 \$1.43	\$0.305 gravel \$0.943 and \$1.213	\$1.19.	
MISCELLANEOUS.					
82. Fuel consumed by dredge, in long tons.....	302	285	002.40	735.2	
83. Fuel consumed by auxiliary plant, in long tons.....	275	072			
84. Cost per hour of effective working time.....	\$24.597	\$16.03	\$5.103	\$15.08	
85. Cost of fuel per ton.....	\$3.286	\$3.08	\$0.266	\$2.688	
86. Number of days in commission.....	191	309	331	190	
	Remarks.	Remarks.	Remarks.	Remarks.	
There were no drill boats operated in connection with this dredge.	Mississippi River, Rock Island division, Le Claire Canal dredge, sand and rock, Nov. 23 to 27, inclusive, leased to Central Union Telephone Co.	Operations of drill unit No. 1-B not included in above operating costs.	Drill units 1-H and 2-H not included in above operating costs.	1 Includes quarter boat and shop-boat repairs. 2 Includes field office, Nashville and Cincinnati office expenses.	
Item 82. "Renewals or additions to plant" include the installation of a new boiler and an electric lighting plant; new boiler was installed in December, 1915. Boiler dimensions given refer to old boiler used on work in 1916.	"Ruth and Le Claire" included in operating cost.	1 Includes quarter-boat repairs. 2 Includes field office, Nashville and Cincinnati office expenses.			

TABLE VI.—*Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916—Continued.*

Name, letter, or number.....	Tucumbia.	Upstet.	Valera.	Wauaga.
1. District.....	Chattanooga, Tenn.	Montgomery, Ala.	St. Louis, Mo.	Chattanooga, Tenn.
2. Length.....	100 feet.	85 feet.	80 feet.	100 feet.
3. Beam.....	34 feet.	30 feet.	30 feet.	34 feet.
4. Depth.....	6 feet 10 inches.	6 feet.	8 feet.	Forward 7 feet 10 inches; aft, 6 feet 10 inches.
5. Draft.....				5 feet 10 inches.
(a) Forward.....	5 feet.	3 feet.	4 feet.	5 feet 6 inches.
(b) Aft.....	3 feet.	3 feet.	3 feet 2½ inches.	4 feet.
6. Displacement.....	375 tons.	217 tons.	240 tons.	400 long tons.
7. Builders.....	U. S. Engineer Department, wood.	U. S. Engineer Department, wood.	Jacob Eckhart, Davenport, Iowa.	U. S. Engineer Department, wood.
8. Where built.....	Vulcan Steam Shovel Co., Muskego, Ohio; hull, Muskego Shoals Canal.	Marion Steam Shovel Co., Columbus, Ga.	Osgood Dredge Co., Davenport, Iowa.	Buckner Co., Hurl, Muscle Shoals Canal, Ala.
9. When built.....	June, 1912.	1909.	1883.	1912.
10. Time to build.....	1 year.	8 months.	9 months.	11 months.
11. Contract cost.....	Machinery, \$20,000.	\$8,312.24.	\$19,450.	Machinery, \$25,500.
12. Finished cost with outfit (exclusive of outfit, masts, tugs, and launches).	\$45,870.92.	\$15,717.74.	\$19,450.	\$49,327.10.
13. Buoys.....				
(a) Type.....	Dipper.	Dipper.	Dipper.	Dipper.
(b) Capacity.....	½ cubic yards rock; 2 cubic yards mud, etc.	2 cubic yards.	1½ cubic yards.	2 cubic yards rock; 4 cubic yards mud and sand.
14. Length of boom.....	45 feet.	35 feet, steel.	34 feet.	45 feet.
15. Maximum dredging depth.....	16 feet.	12 feet.	17 feet.	16 feet.
16. Dimensions of main hoisting-engine cylinders.....	10 by 14 inches.	10½ inches diameter, 12-inch stroke.	12 by 18 inches.	12 by 16 inches.
17. Dimensions of swinging engine.....	8 by 10 inches.		7 by 10 inches.	8 by 8 inches.
18. Boilers.....				
(a) Number.....	1.	1.	1.	1.
(b) Type.....	Locomotive fire tube.	Scottish marine waterback.	Firebox.	Locomotive.
(c) Dimensions.....	66 inches diameter, 20 feet long.	8 feet 3 inches diameter, 17 feet long.	5 feet by 15 feet 10 inches.	7½ inches diameter, 18 feet 6 inches long.
(d) Number, diameter, and length of tubes in 1 boiler.....	112; 3 inches diameter, 13 feet long.	80 tubes, 3½ inches diameter, 13 feet long.	92; 3 inches diameter, 117 inches long.	120; 3 inches diameter, 12½ feet long.
(e) Heating surface (total).....	1,500 square feet.	7,096 square feet.	1,189 square feet.	1,288 square feet.
(f) Grate surface (total).....	25 square feet.	24 square feet.	20 square feet.	27½ square feet.
19. Working steam pressure.....	125 pounds.	100 pounds.	100 pounds.	125 pounds.

FLOATING PLANT.

4195

ATTENDANT PLANT.									
Towboats.									
20. Name of tug attached to dredge.	Lookout and King	I. W. Callahan, Jr.							
21. Owner.	U. S. Engineer Department	The Callahan Line							
22. Number of crew.	Lookout 8, King 7, to each shift.								
23. Name.	No. 7.								
24. Number of crew.	1.								
Scows.									
25. Number of scows in use.	2.								
26. Type.	Side dump.								
27. Capacity (each).	150 cubic yards each.								
28. Identifying letter or number.	Nos. 11 and 12.								
WORK PERFORMED.									
29. Location of dredging.	Florence Bridge, Kogers Island, and Tussumblia Bar, Tennessee River.	Flint River, Ga.							
30. Average depth before dredging.	4 feet.								
31. Average depth after dredging.	6 feet.								
32. Average width of cut.	37 1/2 feet.								
33. Total distance cut ahead by dredge, in feet.	28,480.								
34. Total amount dredged in cubic yards during year.	(a) 16,525; (1) \$1.46. (b) 20,700 gravel; (2) \$0.192.								
35. Average number of cubic yards dredged.	(a) Rock; (1) unit cost. (b) Sand and mud; (2) unit cost.								
(a) Per day.	207.								
(b) Per hour.	19.								
36. Maximum number of cubic yards dredged.	850.								
(a) In 1 day.	106.								
(b) In 1 hour.	10.8.								
37. Average number of hours worked per day.	181.								
38. Total number of days upon which any dredging was done.	1.								
39. Average distance in miles from work to dump.	510.								
40. Number of scows loaded during year.									

TABLE VI.—Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.....	Tucumbeles.		Upatoi.		Palena.		Watasge.	
	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
WORK PERFORMED—continued.								
41. Number of scows loaded per day.....								
42. Average time to load 1 scow.....							5.48.	
43. Average load in cubic yards per scow.....							30 minutes.	
44. Average time to tow load to dump and return.....							76 yards.	
45. Number of scows per tow.....							30 minutes.	
46. Character of dredged material and average percentage:							1.	
(a) Mud.....								
(b) Rock.....								
(c) Sand.....								
			77.8 per cent.				36 per cent.	
			22.2 per cent.				64 per cent sand and gravel.	
Distribution of effective working time in hours.								
47. Dredging.....	1,715		1,015				2,678	20
48. Handling scows.....	128						88	40
49. Spudding up.....	42						58	
50. Miscellaneous.....	76							
Distribution of time lost in hours.								
51. Repairing:								
(a) Hull.....	112							
(b) Machinery.....	46						7	
52. Bad weather.....	898		88				3,168	
53. Changing location of plant.....	20		328				12	
54. Delays.....	12		171				16	
55. Sundays and holidays.....	1,446		1,594				1,440	20
56. Out of commission.....	4,288		659				1,316	
57. Miscellaneous.....	16		4,542					
58. Total number of hours in year.....	8,784		8,784				8,784	

COST OF WORK.

<i>Dredge.</i>				
59. Pay rolls.....	\$4,992.42	\$10,137.77		\$4,002.80
60. Coal.....	1,723.00	1,925.58		2,185.28
61. Supplies:				
(a) Subistence.....	1,233.25	2,514.95		1,557.98
(b) Machinery.....	504.30	402.89		179.25
(c) Miscellaneous.....	162.80	4,911.47		357.25
62. Renewals or additions to outfit.....		420.00		
63. Ordinary repairs:				
(a) Hull.....	2,073.30			54.80
(b) Machinery.....	2,904.51	721.88		1,912.58
64. Laundry, ice, miscellaneous.....	215.00	340.31		215.50
65. Total.....	\$13,512.58	\$21,374.85	\$480.00	\$12,518.56
<i>Towboats.</i>				
66. Operating cost for year.....	7,877.00	2,377.24		6,189.00
67. Ordinary repairs.....	2,576.70			1,590.50
68. Total.....	10,453.70	2,377.24		7,788.80
<i>Launch.</i>				
69. Operating cost for year.....	124.90			101.55
70. Ordinary repairs.....	142.38			18.59
71. Total.....	267.28			120.44
<i>Barges and scows.</i>				
72. Ordinary repairs.....		217.32		1,297.60
73. Total.....	2,052.34	217.32		1,297.60
74. Total field cost.....	\$26,295.90	\$22,969.41		\$21,722.10
<i>Gross cost.</i>				
75. Office expenses, superintendence, surveys, etc.....	\$1,849.00			\$1,142.18
76. Extraordinary repairs to dredge:				
(a) Hull.....				
(b) Machinery.....		1,631.78		
77. Extraordinary repairs to towboats and launches.....				
78. Extraordinary repairs to barges and scows.....				
79. Grand total.....	\$26,144.90	\$28,608.55		\$22,864.28

TABLE VI.—Report of operations of dpper dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.....	Tucumbla.	Upatoi.	Vukua.	Waiuaga.
COST OF WORK—continued.				
<i>Cost per cubic yard.</i>				
80. Field cost per cubic yard:				
(a) Mud or sand.....	\$0.18 gravel.....	\$0.151.....		\$0.127 gravel.
(b) Rock.....	\$1.366.....	\$0.274.....		\$0.245.....
81. Gross cost per cubic yard:				
(a) Mud or sand.....	\$0.192 gravel.....	\$0.163.....		\$0.133 gravel.
(b) Rock.....	\$1.46.....	\$0.332.....		\$0.268.....
MISCELLANEOUS.				
82. Fuel consumed by dredge in long tons.....	641.4.....	120.4 tons coal; 667 cords wood.		826.....
83. Fuel consumed by auxiliary plant in long tons.....		131 cords wood.....		
84. Cost per hour of effective working time.....	\$14.37.....	\$28.17.....		\$8.10.....
85. Cost of fuel per ton.....	\$2.686.....	Coal, \$4.69 per ton; wood, \$1.83 per cord.		\$2.647.....
86. Number of days in commission.....	181.....	343.....	Not in commission.....	396.....
	<i>Remarks.</i>	<i>Remarks.</i>	<i>Remarks.</i>	<i>Remarks.</i>
	Drill units 1-H and J—H not included in above operating costs. 1 Includes repairs to quarter boats and shopboats. 2 Includes field, Nashville, and Cincinnati office expenses.	The drilling barge No. 46 was used as attendant drill boat for drilling and blasting rock and its costs are included in the above report.	Purchased from Rock Island, Ill., district, November, 1916.	Operations of drill units 2-8 and 4-8 are not included in above costs. 1 Includes repairs to quarter boats. 2 Includes field, Nashville, and Cincinnati office expenses.

Name, letter, or number.	No. 1.	No. 2.	No. 68.
1. District.....	Pittsburgh, Pa.	Pittsburgh, Pa.	Little Rock, Ark.
2. Length.....	86 feet.	86 feet 6 inches.	104 feet 7 inches.
3. Beam.....	32 feet.	30 feet.	80 feet 6 inches.
4. Depth.....	7 feet.	4 feet 8 inches.	5 feet 4 inches.
5. Draft:			
(a) Forward.....	5 feet.	3 feet 2 inches.	3 feet.
(b) Aft.....	3 feet 3 inches.	2 feet 6 inches.	2 feet.
6. Displacement.....	303 tons.	197 tons.	220 tons.
7. Builder:			
(a) Hull and material of hull.....	New hull, U. S. Boat Yard, Lock 4, Pa., wood.	Parkersburg Dock Co., wood.	U. S. Engineers, crosscut pine.
(b) Machinery.....	M. A. Sweeney Shipyard and Foundry Co.	The Bucyrus Co., Milwaukee, Wis.	Bucyrus Co.
8. Where built.....	Old hull, Jeffersonville, Ind., 1908.	Parkersburg, W. Va.	Hull, at Batesville, Ark.
9. When built.....	New hull, U. S. Boat Yard, Lock 4, Pa., 1911-1912.	1905.	Hull, 1912; machinery, 1896; boiler, 1905.
10. Time to build.....	New hull, 7 months.		34 months.
11. Contract cost.....	Old hull, \$19,740; including machinery, new hull, \$15,810.40.	\$17,000.	\$12,673.83 (hired labor).
12. Finished cost with outfit (exclusive of scows, tugs, and launches).		Purchased from the Evansville Contract Co.	\$15,485.55. ¹
13. Bucket:			
(a) Type.....	Dipper.	Dipper.	Dipper.
(b) Capacity.....	2.3 yards and 3 yards.	1.75 and 2.25 yards.	14 cubic yards.
14. Length of boom.....	40 feet.	35 feet.	50 feet.
15. Maximum dredging depth.....	23 feet.	20 feet 6 inches.	18 feet.
16. Dimensions of main hoisting-engine cylinders.	11-inch diameter, 14-inch stroke.	10-inch diameter, 14-inch stroke.	9 by 12 inches.
17. Dimensions of swinging engine.....	8 by 8 inches, 2 cylinders, horizontal.	8 by 8 inches.	8 by 10 inches.
18. Boilers:			
(a) Number.....	2.	2.	1.
(b) Type.....	1 vertical, 1 locomotive.	1 vertical, 1 locomotive.	6-flue Mississippi River type.
(c) Dimensions.....	Vertical, 7 feet 3 inches by 30 inches diameter; locomotive, 17 feet 4 inches by 60 inches diameter.	Vertical, 7 feet by 36 inches diameter; locomotive, 17 feet 4 inches by 62 inches diameter.	42 inches by 22 feet.
(d) Number, diameter, and length of tubes in one boiler.....	Vertical, 31, 2 inches diameter by 4 feet 10 inches long; locomotive, 76, 3 inches diameter by 12 feet long.	Vertical, 68, 2 inches diameter by 3 feet 2 inches long; locomotive, 76, 3 inches diameter by 12 feet long.	Two 12-inch, four 6-inch, 22 feet long.
(e) Heating surface (total).....	Vertical, 80 square feet; locomotive, 940 square feet.	Vertical, 128 square feet; locomotive, 625 square feet.	438 square feet.
(f) Grate surface (total).....	Vertical, 3.1 square feet; locomotive, 22.5 square feet.	Vertical, 4.9 square feet; locomotive, 22.5 square feet.	18 square feet.
19. Working steam pressure.....	Vertical, 125 pounds; locomotive, 150 pounds.	Locomotive, 125 pounds.	90 pounds per square inch

TABLE VI.—Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.....	No. 1.	No. 2.	No. 68.
ATTENDANT FLANT.			
<i>Towboats.</i>			
20. Name of tug attached to dredge.....			
21. Owner.....	Steamer T. P. Roberts.	U. S. snagboat Swan.	A. D. Allen and Quapaw. ¹
22. Number of crew.....	United States. 10.	United States. 14.	U. S. Engineers. 8.
<i>Launches.</i>			
23. Name.....			
24. Number of crew.....			
<i>Scows.</i>			
25. Number of scows in use.....	2.	2.	2. ¹
26. Type.....	Dump, 4 pockets, nonpropelling.	Dump, 4 pockets, nonpropelling.	Hopper top, side dump.
27. Capacity (each).....	90 cubic yards.	90 cubic yards.	200 tons.
28. Identifying letter or number.....	Nos. 5 and 6.	Nos. 1 and 2.	D. S. 1 and D. S. 2.
WORK PERFORMED.			
29. Location of dredging.....	Dams Nos. 9 and 10, Opla River.	Monongahela River, Locks Nos. 2, 3, 4, 6 and 11.	White and Black Rivers, Ark.
30. Average depth before dredging.....	4 to 12 feet.	4 to 8 feet.	2.5 feet.
31. Average depth after dredging.....	6 to 16 feet.	8 to 12 feet.	8 feet.
32. Average width of cut.....	40 to 145 feet.		80 feet.
33. Total distance cut ahead by dredge, in feet.....			16,204.
34. Total amount dredged in cubic yards during year:			
(a) Rock; (1) unit cost.....	(a) 1,575.	(a) 104.	(a) 18; (1) 80.31.
(b) Sand and mud; (2) unit cost.....	(b) 115,640.	(b) 82,466.	(b) 57,006; (2) 80.084.
35. Average number of cubic yards dredged:			
(a) Per day.....	778.	500.	494+ cubic yards.
(b) Per hour.....	97.	63.	83— cubic yards.
36. Maximum number of cubic yards dredged:			
(a) In one day.....	1,080.	1,080.	900 cubic yards.
(b) In one hour.....	136.	97.	76 cubic yards.
37. Average number of hours worked per day.....	8.	8.	8 hours.
38. Total number of days upon which any dredging was done.....	200.	315.	115 days.

	½ to 2 miles.		½ mile.		Alongside except when boat filling dams	
	Hours.	Minutes.	Hours.	Minutes.		
39. Average distance in miles from work to dump.			740.			
40. Number of scoops loaded during year.			1 to 12.			
41. Number of scoops loaded per day.			90.			
42. Average time to load one scoop.			1.			
43. Average load in cubic yards per scoop.						
44. Average time to tow load to dump and return.						
45. Number of scoops per tow.						
46. Character of dredged material and average percentage:						
(a) Mud.						
(b) Rock.						
(c) Sand.						
Distribution of effective working time in hours.						
47. Dredging.	1,080		1,383			
48. Handling scoops.						
49. Spudding up.						
50. Miscellaneous.	144		64			
Distribution of time lost in hours.						
51. Repelling:						
(a) Hull.						
(b) Machinery.						
52. Bad weather.	581		333			
53. Changing location of plant.	600		240			
54. Delays.	48		123			
55. Sundays and holidays.	16		272			
56. Out of commission.	533		524			
57. Miscellaneous.	5,790		5,703			
58. Total number of hours in year.	8,764		8,764			

TABLE VI.—Report of operations of dipper dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.....	No. 1.	No. 2.	No. 3.
COST OF WORK.			
<i>Dredge.</i>			
59. Pay rolls.....	\$7,977.93	\$7,710.75	\$2,924.65
60. Coal.....	1,879.94	1,556.25	683.19
61. Supplies:			
(a) Substance.....	1,964.78	1,784.81	1,154.10
(b) Machinery.....	73.91	67.96	67.07
(c) Miscellaneous.....	100.51	183.96	97.66
62. Renewals or additions to outfit.....	884.18	477.74	200.30
63. Ordinary repairs:			
(a) Hull.....	290.79	82.67	119.68
(b) Machinery.....	1,264.56	522.75	239.00
64. Laundry, ice, miscellaneous.....	232.29	346.33	94.16
65. Total.....	\$14,557.91	\$12,745.50	\$5,526.84
<i>Towboats.</i>			
66. Operating cost for year.....	7,666.30	3,601.63	6,702.26
67. Ordinary repairs.....	221.83	271.38	.....
68. Total.....	7,888.13	3,873.01	6,729.12
<i>Launch.</i>			
69. Operating cost for year.....	.....	.....	6,200.65
70. Ordinary repairs.....	.....	.....	.....
71. Total.....	.....	.....	6,200.65
<i>Barges and scows.</i>			
72. Ordinary repairs.....	.....	.....	.....
73. Total.....	.....	.....	194.73
74. Total field cost.....	\$22,476.04	\$16,618.51	6,384.50
			\$6,384.50

Gross cost.		Gross cost.	
75. Office expenses, superintendence, surveys, etc.	.....	.....	495.83
76. Extraordinary repairs to dredges:	.....	.....	846.55
(a) Hull	.....	.....
(b) Machinery	.....	.....
77. Extraordinary repairs to towboats and launches	.....	.....
78. Extraordinary repairs to barges and scows	.....	.....
Grand total	.....	.....	7,726.88
79. Cost per cubic yard.	.....	.....
80. Field cost per cubic yard:	.....	.....	\$0.112
(a) Mud or sand	.....	.....	\$0.382
(b) Rock	.....	.....
81. Gross cost per cubic yard:	.....	.....	\$0.135
(a) Mud or sand	.....	.....	\$0.465
(b) Rock	.....	.....
MISCELLANEOUS.	.....	.....
82. Fuel consumed by dredge in long tons	1,095.	832.	253+.
83. Fuel consumed by auxiliary plant in long tons	556.7.	222.	5 tons.
84. Cost per hour of effective working time	\$18.53	\$11.42	\$8.58.
85. Cost of fuel per ton	\$1.60 to \$2.50	\$1.60 to \$4.	\$2.74.
86. Number of days in commission	365.	365.	131.

Remarks.

No drill boats.
 1 Rebuilt value, including worth of old machinery and upper works transferred from old hull to new hull.
 2 Not regularly attached; used only for moving dredges for changing location of dredges and for towing dump scows when back filling dams.
 3 Used only when back filling dams.
 4 9,351 cubic yards sand and mud; 47,456 cubic yards gravel.
 5 While with dredge only.

Remarks.

No drill boats.

Rebuilt value, including worth of old machinery and upper works transferred from old hull to new hull.

²Not regularly attached; used only for moving dredges for changing location of dredge and for towing dump scows when back filling dams.

- Used only when back-filling dams.

• Used only when back filling dams.
49,351 cubic yards sand and mud; 47,456 cubic yards gravel.

⁶ While with dredge only.

TABLE VII.

BUCKET DREDGES.

4205

TABLE VII.—Report of operations of bucket dredges for the calendar year ending Dec. 31, 1916.

Name, letter, or number.	Ajex.	Alabama.	Albany. ¹	Bardonia.
1. District.	Wilmington, N. C.	Chattanooga, Tenn.	Montgomery, Ala.	New Orleans (fourth Mississippi River).
2. Length.	82 feet.	80 feet.	70 feet.	102 feet.
3. Beam.	32 feet 8 inches.	37 feet 8 inches.	30 feet.	36 feet.
4. Depth.	10 feet 4 inches.	6 feet 4 inches.	4 feet 9 inches.	6 feet 1 inch.
5. Draft.				
(a) Forward.	5 feet 8 inches.	3 feet 6 inches.	5 feet 8 inches.	3 feet.
(b) Aft.	5 feet 2 inches.	3 feet 6 inches.	5 feet 2 inches.	3 feet.
6. Displacement.	400 tons.	244 long tons.	75 tons.	302 tons.
7. Builder:				
(a) Hull and material of hull.	See Island Chemical Co.	Bugyrus Co., wood.	U. S. Engineer Department, wood.	U. S. Engineers, wood.
(b) Machinery.	Capeland & Bacon and Theo. Smith Sons Co.	Bugyrus Co.	Contractors Plant Manufacturing Co.	McMylor Co., Cleveland, Ohio.
8. Where built.	Port Royal, S. C.	Hull, Chattanooga, Tenn.; machinery, Bugyrus, Ohio.	Columbus, Ga.	New Orleans, La.
9. When built.	1894.	1891; rebuilt 1906 and 1913.	1908.	1904.
10. Time to build.		1 year.	4 months.	7 months.
11. Contract cost.		\$22,300.	\$18,583.68.	\$30,315.85.
12. Finished cost with outfit (exclusive of barges, tugs and launches).		\$22,500.		
13. Where purchased.	Charleston, S. C.	Chattanooga, Tenn.		
14. When purchased.	1897.	1891.		
15. From whom purchased.	Cordis & Bachman.	The Bugyrus Co.		
16. Purchase price.	\$16,060, including outfit.	\$22,300.		
17. Bucket:				
(a) Type.	Clamshell.	Chain of 24 buckets and links.	Orange-peel.	2 buckets orange-peel, Hayward.
(b) Capacity.	5 cubic yards.	5 cubic feet to each bucket.	1 cubic yard.	2 and 21 cubic yards.
18. Length of boom and material.	50 feet wood.	None.	60 feet wood.	Steel, 100 feet.
19. Maximum dredging depth.	25 feet with present chains.	10 feet.	15 feet.	50 feet.
20. Dimensions of main hoisting-engine cylinders.	Two 18-inch diameter, 24-inch stroke.	10 by 14 inches.	84 by 10 inches.	12 by 16 inches.
21. Dimensions of swinging engine.				
22. Boiler:				
(a) Number.	1.	8 by 8 inches.		Do.
(b) Type.	Locomotive.	Marine.	Upright.	Vertical tubular.
(c) Dimensions.	Length 18 feet 11 inches; width of firebox, 6 feet 10 inches inside.	60 inches diameter, 17 feet long.	50 inches diameter, 10 feet long.	13 feet 2 inches high 74 inches diameter.
(d) Number, diameter, and length of tubes in one boiler.	114 2-inch tubes, 13 feet 6 inches long.	68 3 inches diameter, 6 feet 4 inches long.	126 1½ inches diameter, 6 feet 4 inches long.	286 2½-inch tubes.
(e) Heating surface (total).	1,441 square feet.	480 square feet.	432 3/4 square feet.	1,837 square feet.
(f) Grate surface (total).	27.6 square feet.	16 square feet.	9.63 square feet.	17.1 square feet.
(g) Working steam pressure.	90 pounds.	80 pounds.	100 pounds.	100 pounds.

ATTENDANT PLANT.					
<i>Towboat.</i>					
23. Name of tug attached to dredge.....	Coquet and Cynthia.....	None.....	None.....	None used.	
24. Owner.....	U. S. Engineer Department.....				
25. Number of crew.....	8.....				
<i>Lawcher.</i>					
26. Name.....	Polly.....	None.....	None.....	Do.	
27. Number of crew.....	No regular crew.....				
<i>Scow.</i>					
28. Number of scows in use.....	1.....	None.....	None.....	Do.	
29. Type.....	Bottom dump (pocket).....				
30. Capacity (each).....	302 yards.....				
31. Identifying letters or numbers.....	D.....				
WORK PERFORMED.					
32. Location of dredging.....	River Shoals and Lock No. 2, Cape Fear River, above Wilmington, N. C.	Muscle Shoals Canal, Ala.	Lower Chipola River, Fla.	Various levees.	
33. Average depth before dredging.....	5.1 feet.....	4 feet.....	4 feet.....		
34. Average depth after dredging.....	9 feet.....	6 feet.....	6 feet.....		
35. Average width of cut.....	50 feet.....	80 feet.....	35 feet.....		
36. Total distance cut ahead by dredge in feet.....	22,700.....	2,000.....	1,200.....		
37. Total amount dredged in cubic yards during year.....	(a) 190,078; (2) \$0.10 1/4 +.....	(b) 8,855; (2) 2 1/2 cents.....	(c) None.....	(2) 189,855.	
38. Average number of cubic yards dredged.....	1,000.4.....	466.....	229.....	1,050.	
39. Maximum number of cubic yards dredged.....	128.7.....	58.....	37.....	91.7.	
40. Average number of hours worked per day.....	(a) In one day.....	1,338.....	400.....	2,720.	
41. Total number of days upon which any dredging was done.....	(b) In one hour.....	143.....	50.....	150.	
42. Average distance in miles from work to dump.....	8.....	11.4.....	7.....	11 hours 37 minutes.	
43. Number of scows loaded during year.....	190.....	19.....	118.....	162.....	
44. Number of scows loaded per day.....	0.4.....	Material discharged through pipe.....	None; dump on bank.....		
45. Average time to load one scow.....	633.....		None.....		
46. Average load in cubic yards per scow.....	31.....		do.....		
	2 hours 20 minutes.....		do.....		
	300.....		do.....		

TABLE VII.—Report of operations of bucket dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter or number.....	A. Tex.		Alabama.		Ala. Bay.		Barataria.	
	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
WORK PERFORMED—Continued.								
463. Average time to tow load to dump and return.....								
47. Number of scoops per tow.....								
48. Character of dredged material and average percentage:								
(a) Mud.....			50 per cent.		70 per cent.			
(b) Rock.....					None.			
(c) Sand.....			50 per cent.		30 per cent.			
Distribution of effective working time in hours.								
49. Dredging.....	1,476	45	182		720		1,740	
50. Waiting on tug.....	347	45						
51. Spudding up.....								
52. Miscellaneous.....	1,120	15						
Distribution of time lost in hours.								
53. Repairing:								
(a) Hull.....	131	20			20		260	
(b) Machinery, and cleaning boiler.....	231				162		34	
54. Bad weather.....	110						602	
55. Changing location of plant.....	72				4		319	
56. Delays.....							1,188	
57. Sundays and holidays.....	1,521	30	1,440		1,440		3,674	
58. Out of commission, nights.....			4,886		6,328		1,077	
59. Miscellaneous.....	63	15	2,266		112			
60. Total number of hours in year.....	8,784		8,784		8,784		8,784	
COST OF WORK.								
Dredge.								
61. Pay rolls.....	\$6,327.37		\$939.45		\$3,749.17		\$9,745.25	
62. Coal.....	2,414.03		129.20		586.64		1,290.83	
63. Supplies:								
(a) Subsistence.....	1,479.88		215.83		838.90		2,126.45	
(b) Machinery.....	177.06		10.88		94.87			
(c) Miscellaneous.....			7.86		123.46		1,266.86	

FLOATING PLANT.

4209

64. Renewals or additions to outfit, property, and rope.	574.76					707.66
65. Ordinary repairs:						
(a) Hull.....	277.80				\$1.00	
(b) Machinery.....	178.72				241.90	
(c) Laundry, etc., miscellaneous.....	60.43				178.72	
66. Total.....	\$12,040.20				\$4,577.45	\$15,002.13
67. <i>Towboat.</i>						
68. Operating cost for year.....	6,643.70					
69. Ordinary repairs.....	340.72					
70. Total.....	6,984.46					
71. <i>Barges and scows.</i>						
72. Ordinary repairs.....	62.37					
73. Total.....	62.37					
74. Total field cost.....	\$19,087.03			\$1,977.44	\$4,577.45	\$15,002.13
75. <i>Gross cost.</i>						
76. Office expenses, superintendence, surveys, etc.		73.81				312.04
77. Extraordinary repairs to dredge:						
(a) Hull.....	84.14					
(b) Machinery.....	7.15					
78. Extraordinary repairs to towboats and launches,	1,001.67				117.94	11,498.46
79. Extraordinary repairs to barges and scows.						
80. Grand total.....	20,203.90			1,977.44	5,390.90	27,412.08
81. <i>Cost per cubic yard.</i>						
82. Field cost per cubic yard:						
(a) Mud or sand.....	90.10		244 cents; mud and sand.....	90.13		9.8 cents.
(b) Rock.....						
83. Gross cost per cubic yard:						
(a) Mud or sand.....	90.106		244 cents; mud and sand.....	90.196		17.3 cents.
(b) Rock.....						

TABLE VII.—Report of operations of bucket dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.....	Ajax.	Alabama.	Albany.	Barataria.
COST OF WORK—continued.				
<i>Miscellaneous.</i>				
80. Fuel consumed by dredge in long tons.	453.38			
81. Fuel consumed by auxiliary plant in long tons.	220.23			
82. Cost per hour of effective working time.	\$7.36			
83. Cost of fuel per ton.	\$4.69			
84. Number of days in commission.	366			
	<i>Remarks.</i> In addition to dredging, the Ajax did a considerable amount of miscellaneous work at Lock and Dam No. 2, Cape Fear River, such as siphoning abutment cofferdam, grading banks, etc. The total cost of this work was \$1,415.37. This amount is not included above in the statement of operating expenses. * Long.	<i>Remarks.</i> No attendant plant.	<i>Remarks.</i> No auxiliary plant attached to this dredge. * Formerly Dredge No. 5.	<i>Remarks.</i> This dredge is a levee-building machine and is used for that purpose entirely.
		58. \$13.01. \$2.23. 19.	Coal, 85 tons; wood, 130 cords. None. \$6.08. Coal, \$3.335; wood, \$2.35. 118.	288.1. \$15.75. \$4.48. 213.

FLOATING PLANT.

4211

Name, letter, or number.	Beauregard.	Bureau.	Canada.	Curry.
1. District.....	New Orleans (fourth Mississippi River).	New Orleans (fourth Mississippi River).	First, Portland, Ore.....	Louisville, Ky.
2. Length.....	110 feet.....	110 feet.....	70 feet.....	86 feet.
3. Beam.....	42 feet.....	40 feet.....	30 feet.....	28 feet.
4. Depth.....	7 feet 0 inches.....	7 feet 3 inches.....	4 feet.....	6 feet 5 inches.
5. Draft:				
(a) Forward.....	2 feet 1 inch.....	3 feet.....	1 foot 6 inches.....	2 feet 6 inches.
(b) Aft.....	2 feet 9 inches.....	3 feet.....	1 foot 0 inches.....	2 feet 0 inches.
6. Displacement.....	442 tons.....	341 tons.....	90 tons.....	103.4 long tons.
7. Builder:				
(a) Hull and material of hull.....	Bucyrus Co., South Milwaukee, Wis.	U. S. Engineers; wood.....	U. S. Engineers; wood.....	United States; wood.
(b) Machinery.....	do.....	McMyer Co., Cleveland, Ohio.....	Lidgarwood Manufacturing Co.....	J. S. Mundy & Co. and Lambert Engineering Co.
8. Where built.....	New Orleans, La.....	New Orleans, La.....	Portland, Ore.....	Louisville, Ky.
9. When built.....	1914-15.....	1913-14.....	1908; new hull, 1915.....	1907.
10. Time to build.....	5 months.....	4 months.....	3 months.....	3 months.
11. Contract cost.....	\$51,233.....	\$40,080.....	\$6,050.....	\$15,122.12.
12. Finished cost with outfit (exclusive of barges, tugs, and launches).				
13. Where purchased.....				
14. When purchased.....				
15. From whom purchased.....				
16. Purchase price.....				
17. Bucket:				
(a) Type.....	1 clamshell, 1 dredge, 2 orange-peel.	1 clamshell, 2 dragline, 1 orange-peel.	Hayward.....	Clamshell and orange-peel.
(b) Capacity.....	3 cubic yards, 31 cubic yards, 3 and 24 cubic yards.	3 cubic yards, 24 and 3 cubic yards, and 11 cubic yards.	1 cubic yard.....	2 cubic yards and 14 cubic yards.
18. Length of boom and material.....	127 feet; steel.....	124 feet; steel.....	52 feet; wood.....	42 feet; steel.
19. Maximum dredging depth.....	50 feet or more.....	50 feet or more.....	14 feet.....	30 feet.
20. Dimensions of main hoisting-engine cylinders.....	13 by 15 inches.....	12 by 16 inches.....	10 inches diameter by 12-inch stroke.....	Double cylinder, 11 by 18 inches.
21. Dimensions of swinging engine.....	10 by 10 inches.....	Same.....	None.....	64 by 8 inches.
22. Boilers:				
(a) Number.....	1.....	1.....	1.....	1.
(b) Type.....	Locomotive type.....	Vertical, tubular.....	Vertical.....	Locomotive.
(c) Dimensions.....	23 feet long, 84 inches wide.....	6 feet 2 inches by 14 feet.....	48 inches diameter, 108 inches height.....	44 by 104 feet.
(d) Number, diameter, and length of tubes in one boiler.....	170, 3 inches, 12 feet.....	230, 21 inches, 9 feet 9 inches.....	146, 2 inches, 6 feet.....	70, 3 inches, 12 feet 1 inch.
(e) Heating surface (total).....	1,428 square feet.....	1,374 square feet.....	354 square feet.....	805 square feet.
(f) Grate surface (total).....	46.28 square feet.....	20.29 square feet.....	10 square feet.....	20 square feet.
(g) Working steam pressure.....	125 pounds.....	100 pounds.....	120 pounds.....	110 pounds.

TABLE VII.—Report of operations of bucket dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.....	Beauregard.....	Berea.....	Cascade.....	Cory.....
ATTENDANT PLANT.				
<i>Towboat.</i>				
23. Name of tug attached to dredge.....	None used.....	None used.....	La Crosse.....	Cherokee.....
24. Owner.....			Wind River Lumber Co.....	United States.....
25. Number of crew.....			2.....	4.....
<i>Levee.</i>				
26. Name.....	None used.....	None used.....	None.....	None.....
27. Number of crew.....				
<i>Sows.</i>				
28. Number of sows in use.....	None used.....	None used.....	2.....	6.....
29. Type.....			Bottom dump.....	Bottom dump.....
30. Capacity (each).....			194.6 cubic yards.....	100 and 150 cubic yards.....
31. Identifying letters or numbers.....			Nos. 1 and 2.....	Nos. 17, 18, 19, 20, 21, and 22.....
WORK PERFORMED.				
32. Location of dredging.....	Various levees.....	Various levees.....	Entrance to Cascade Locks.....	Louisville and Portland Canal, and Locks 41 and 43, Ohio River.....
33. Average depth before dredging.....			4.5 feet.....	4 feet 7 inches.....
34. Average depth after dredging.....			9 feet.....	9 feet 11 inches.....
35. Average width of cut.....			60 feet.....	30 feet 4 inches.....
36. Total distance cut ahead by dredge, in feet.....			3,931 feet.....	20,283 feet.....
37. Total amount dredged in cubic yards during year: (a) Rock; (1) unit cost. (b) Sand and mud; (2) unit cost.	(b) Silt and clay, 466,366.....	(b) 358,416.....	(b) 37,531; (3) 80,128.....	(a) 4,790. ¹ (b) 150,000 ¹ ; (3) 80,000.
38. Average number of cubic yards dredged: (a) Per day..... (b) Per hour.....	2,100..... 123.....	1,894..... 120.....	478..... 59.....	668..... 138.....
39. Maximum number of cubic yards dredged: (a) In one day..... (b) In one hour.....	4,940..... 240.....	3,900..... 170.....	754..... 130.....	1,500..... 340.....
40. Average number of hours worked per day.....	17 hours 45 minutes.....	14 hours 41 minutes.....	8 hours.....	7 hours 46 minutes.....

	216.		208.		79.		194.	
	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
41. Total "number of days" upon which any dredging was done.								
42. Average distance in miles from work to dump.								
43. Number of scows loaded during year.								
44. Number of scows loaded per day.								
45. Average time to load one scow.								
46. Average load in cubic yards per scow.								
47. Average time to tow load to dump and return.								
48. Number of scows per tow.								
49. Character of dredged material and average percentage:								
(a) Mud.								
(b) Rock.								
(c) Sand.								
<i>Distribution of effective working time in hours.</i>								
50. Dredging.	3,799		3,010		481		724	
51. Waiting on tug.					37		25	
52. Spudding up.					1		50	
53. Miscellaneous.							1,088	
<i>Distribution of time lost in hours.</i>								
54. Repairing:								
(a) Hull.	200		455		4		93	
(b) Machinery, and cleaning boiler.	112		77		23		827	
55. Bad weather.	545		1,308		47			
56. Changing location of plant.	46		319		13		179	
57. Delays.	1,404		1,508		99		140	
58. Sundays and holidays.	1,602		434				1,196	
59. Out of commission, nights.	1,076		1,699		7,636		4,800	
60. Miscellaneous.			408				217	
60. Total number of hours in year.	8,794		8,794		8,794		8,794	
<i>COST OF WORK.</i>								
<i>Dredge.</i>								
61. Pay rolls.	\$24,940.73		\$22,908.02		\$2,154.93		\$4,743.49	
62. Coal.	5,117.50		2,581.20		1,165.30		572.23	
63. Supplies:								
(a) Subsistence.	7,843.07		2,605.50				282.50	
(b) Machinery.							43.41	
(c) Miscellaneous.	8,823.40		12,322.79		299.45		53.31	
64. Renewals or additions to outfit, property, and rope.	380.00		403.50		323.42		276.08	

TABLE VII.—Report of operations of bucket dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number	Beaurgard.	Buras.	Cascade.	Casay.
COST OF WORK—Continued.				
<i>Dredge—Continued.</i>				
65. Ordinary repairs:				
(a) Hull.....	1,926.50	4,300.00	23.30	204.79
(b) Machinery.....	859.25	214.53	15.98	1,072.24
66. Laundry, ice, miscellaneous.....				22.63
67. Total.....	49,880.70	\$45,684.93	\$2,901.27	\$7,282.67
<i>Towboat.</i>				
68. Operating cost for year.....			\$1,286.25	4,211.06
69. Ordinary repairs.....				579.39
Total.....			1,286.25	4,790.45
<i>Barges and scows.</i>				
70. Ordinary repairs.....			433.73	204.00
71. Total.....			433.73	204.00
72. Total field cost.....	\$49,880.70	\$45,684.93	\$4,630.30	\$12,277.71
<i>Gross cost.</i>				
73. Office expenses, superintendence, surveys, etc.....				
74. Extraordinary repairs to dredges:				
(a) Hull.....				
(b) Machinery.....				
75. Extraordinary repairs to towboats and launches.....				
76. Extraordinary repairs to barges and scows.....				
77. Grand total.....	\$60,888.50	\$46,568.61	\$4,535.30	\$13,420.41
<i>Cost per cubic yard.</i>				
78. Field cost per cubic yard:				
(a) Mud and sand.....	\$0.1099 (\$0.0725 1/2)	\$0.1179 1/2	\$0.123	\$0.0688
(b) Rock.....				

79. Gross cost per cubic yard: (a) Mud or sand. (b) Rock.		\$0.1091 (\$0.0743 1).	\$0.1199 1.	\$0.129.	\$0.0922.
<i>Miscellaneous.</i>					
80. Fuel consumed by dredge, in long tons.		1,143.		45 cords of wood.	774.
81. Fuel consumed by auxiliary plant, in long tons.					532 (one-half by steamer Chavree).
82. Cost per hour of effective working time.		\$13.39.	\$15.48.	\$8.50.	\$3,536+.
83. Cost of fuel per ton.		\$4.48.	\$4.48.	\$3.70.	\$2.09 average.
84. Number of days in commission.		290.	285.	110.	532.
		<i>Remarks.</i>		<i>Remarks.</i>	
		The dredge is a levee-building machine and only used for that purpose.		! Cord wood. ! Tug rented complete.	
		! Silt and clay.		! Includes 3,800 yards cast aside. ! \$678.30 of this amount not chargeable to dredging.	

TABLE VII.—*Report of operations of bucket dredges for the calendar year ending Dec. 31, 1916—Continued.*

Name, letter, or number.	Grosseille.	Hercules.	Malia.	Manila.
1. District.....	New Orleans, La.	Wilmington, N. C.	Second, Cincinnati, Ohio.	St. Paul, Minn.
2. Length.....	80 feet 4 inches.	100 feet.	70 feet.	106 feet.
3. Beam.....	34 feet 2½ inches.	38 feet.	31 feet 4 inches.	44 feet.
4. Beam.....	5 feet.	11 feet 4 inches.	6 feet 10 inches.	7 feet.
5. Draft:				
(a) Forward.....	3 feet.	5 feet.	3 feet 6 inches.	2 feet 7 inches.
(b) Aft.....	3 feet.	7 feet.	3 feet.	2 feet 5 inches.
6. Displacement.....	258 tons.	670 tons.	160 tons.	307 long tons.
7. Builder:				
(a) Hull and material of hull.....	U. S. Engineer Department; barge hull of wood.	Theo. Smith & Sons Co.	Buoyrus Co.	United States; wood.
(b) Machinery.....	Clyde engine and Pennsylvania Boiler Works boiler.	do.	do.	American Holst & Derrick Co.
8. Where built.....	New Orleans, La.	Jersey City, N. J.	Muskingum River and Buoyrus, Ohio.	Hull Cohasset, Minn.; machinery, St. Paul, Minn.
9. When built.....	1913.	1907.	1887-88.	1914-15.
10. Time to build.....	5 months.	About 6 months.	7 months.	6 months.
11. Contract cost.....	\$15,087.63.	\$61,350.	\$13,000.	\$41,000.
12. Finished cost, with outfit (exclusive of barges, tugs, and launches).	\$16,961.07.	\$64,546.04.	\$17,000.	
13. Where purchased.....		Jersey City, N. J.		
14. When purchased.....		1907.		
15. From whom purchased.....		Theo. Smith & Sons Co.		
16. Purchase price.....		\$61,350.		
17. Bucket:				
(a) Type.....	Hayward Orange Peel.	Clamshell.	Endless chain on ladder.	4-leaved orange peel.
(b) Capacity.....	1½ cubic yards.	7 cubic yards.	24; 3 cubic feet each.	3 cubic yards.
18. Length of boom and material.....	76 feet.	59 feet; wood.	None.	100 feet; steel.
19. Maximum dredging depth.....	10 feet.	About 35 feet.	10 feet.	20 feet with present lines.
20. Dimensions of main hoisting-engine cylinders.	10 by 12 inches.	18-inch diameter, 24-inch stroke.	2; each 10-inch diameter, 16-inch stroke.	2; each 12 by 16 inches.
21. Dimensions of swinging engine.....	None.		None.	2; each 9 by 10 inches.
22. Boilers:				
(a) Number.....	1.	1.	1.	1.
(b) Type.....	Locomotive.	Locomotive.	Locomotive.	Scotch marine, wet back.
(c) Dimensions.....	19 feet long by 5 feet diameter.	22 feet 10 inches long; width of fire box, 7 feet.	17 feet 4 inches by 4 feet.	8 feet 6 inches by 13 feet 6 inches.
(d) Number, diameter, and length of tubes in one boiler.....	88 tubes, 3 inches diameter, 14 feet long.	140; 3-inch tubes 14 feet long.	60; 3 inches diameter, 10 feet long.	138 tubes, each 3 inches by 11 feet.
(e) Heating surface (total).....	1,064 square feet.	1,710 square feet.	675 square feet.	1,465 square feet.
(f) Grate surface (total).....	22 square feet.	30.25 square feet.	18 square feet.	35 square feet.
(g) Working steam pressure.....	100 pounds.	100 pounds allowed, 80 pounds used.	60 pounds.	126 pounds.

ATTENDANT PLANT.

Towboat.

22. Name of tug attached to dredge.
24. Owner.
26. Number of crew.

Launches.

26. Name.
27. Number of crew.

Scows.

28. Number of scows in use.
29. Type.
30. Capacity (each).
31. Identifying letters or numbers.

WORK PERFORMED.

32. Location of dredging.
33. Average depth before dredging.
34. Average depth after dredging.
35. Average width of cut.
36. Total distance cut ahead by dredge in feet.
37. Total amount dredged in cubic yards during year:
(a) Rock; (1) unit cost.
(b) Sand and rock; (2) unit cost.
38. Average number of cubic yards dredged:
(a) Per day.
(b) Per hour.
39. Maximum number of cubic yards dredged:
(a) In one day.
(b) In one hour.
40. Average number of hours worked per day.
41. Total number of days upon which any dredging was done.
42. Average distance in miles from work to dump.
43. Number of scows loaded during year.
44. Number of scows loaded per day.

Caswell, Richard and Cynthia
U. S. Engineer Department.
9 and 8.

None.

2. Bottom dump.
E, 300; G, 500 cubic yards.

E and G.

Old Brunswick Cove.
25 to 27 feet.
27 to 28 feet.
40 feet.
4,465 feet.

(a) 135,000; (1) \$0.065 +
(b) 1,043; (2) \$1.63 +.

2,470 cubic yards.
336 cubic yards.

3,700 cubic yards.
370 cubic yards.
9 hours 42 minutes.

26.
1 mile.
136.
6.

Merrill.
United States.
7.

None.
do.

2. Center dumping.
92 cubic yards.

No. 59 and 60.

Maungum River.

2 feet 2 inches.
6 feet 5 inches.
52.5 feet.
13,402.

(a) 732; (1) \$0.50.
(b) 92,263; (2) \$0.1941.

618.
118.

1,260.
194.
8.

152.
0.29.
712.
6.

Aniakki.
United States.
3.

None.
do.

2 coal flats, 2 tank scows, 2 quarter boats.
Coal, 50 tons each; 1 tank, 15 tons; 1 tank, 35 tons; quarter boats, 25 tons each.
Amik, Nigger, Tigo, Nawapou, Wigwan, Wampoun.

Mississippi River.

3.5 feet.
3 feet.
125 feet.
12,200 feet.

(b) 285,536 cubic yards; (2) \$0.0876 (gross).

3,111.
260.

4,945.
312.
16.

95.
Dump on bank alongside dredge.

TABLE VII.—Report of operations of bucket dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.....	Grassside.		Hercules.		Melia.		Maulo.	
	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
WORK PERFORMED—Continued.								
45. Average time to load one scow.....			1 hour 13 minutes.....		40 minutes.....			
46. Average load in cubic yards per scow.....			412 cubic yards.....		77.....			
46a. Average time to tow load to dump and return.....			1 hour 16 minutes.....		16 minutes.....			
47. Number of scows per tow.....			1.....		1.....			
48. Character of dredged material and average percentage.....								
(a) Mud.....			90 per cent.....		64.1953.....		80.....	
(b) Clay.....			10 per cent.....		0.7874.....		20.....	
(c) Obstructions.....					33.0173.....			
	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
Dredging of effective working time in hours.								
49. Dredging.....	1,287	45	190	45	787	45	1,331	
50. Surging.....	248	45			135	45		
51. Spudding up.....			5		91	50		
52. Miscellaneous.....	11		55	30	43	5		
Distribution of time lost in hours.								
53. Rapairing:								
(a) Hull.....								
(b) Machinery and cleaning boiler.....	472	45	9		56		200	
54. Bad weather.....	84	50	3		425		667	
55. Changing location of plant.....	107	55	18	15	1,092			
56. Delays.....	10		3	30	29	20		
57. Sundays and holidays.....	1,543		144		1,440		432	
58. Out of commission, nights.....	4,383	10	8,300	15	3,831		16,016	
59. Miscellaneous.....	664	50	53	45	111	15		
60. Total number of hours in year.....	8,784		8,784		8,784		8,784	
COST OF WORK.								
Dredge.								
61. Pay rolls.....	\$4,082.92		\$1,084.01		\$4,671.08		\$4,121.82	
62. Coal.....	\$1,332.39		\$1,084.84		460.07		1,210.39	

FLOATING PLANT.

4219

[illegible]

TABLE VII.—Report of operations of bucket dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.....	Grossette.	Hercules.	Malta.	Manito.
COST OF WORK—continued.				
<i>Miscellaneous.</i>				
30. Fuel consumed by dredge in long tons.....	299.80.....	289.29.....	211.....	242.
31. Fuel consumed by auxiliary plant in long tons.....		\$3.6.....	346.....	
32. Cost per hour of effective working time.....	\$6.8904.....	\$26.43+.....	\$10.97.....	\$15.01.
33. Cost of fuel per ton.....	\$4.27.....	\$3.70.....	\$2.21.....	\$5.
34. Number of days in commission.....	294.....	33.....	230.....	173.
	<i>Remarks.</i> 1 Mud and clay. 2 Snagging. 3 Clay. In the dredging operations this dredge made the following distance between sites of work, the cost of travel being included in the cost per cubic yard. Dredge went on ways and was repaired at Morgan City, La. <i>Miles.</i> From Grossette to Bayou Plaquemine..... 5 From Bayou Plaquemine to near Cecelia..... 180 From near Cecelia to Morgan City..... 119 From Morgan City to Bayou Long..... 6	<i>Remarks.</i> There was no drill boat working in connection with this machine. The work done by this machine consisted of trimming edges of cut and searching out and removing stumps from channel limits.	<i>Remarks.</i> 1 Covers construction of two dump scows (\$7,573.96) and purchase of manila rope (\$140.03).	<i>Remarks.</i> No attendant drill boats. 1 Includes winter. 2 Includes launch. 3 Authority E. D. 92347/213.
	Total.....			310

Name, letter, or number	Mason.	Monticello.	Omro.	Oakoth.
1. District.....	Wheeling, W. Va.....	Second, Portland, Oreg.....	Milwaukee, Wis.....	Milwaukee, Wis.
2. Length.....	100 feet.....	103 feet 3 inches.....	100 feet.....	75 feet.
3. Beam.....	27 feet.....	34 feet 6 inches.....	30 feet.....	31 feet.
4. Depth.....	5 feet 6 inches.....	5 feet 10 inches.....	6 feet.....	6 feet.
5. Draft:				
(a) Forward.....	2 feet 6 inches.....	2 feet 3 inches.....	1 foot 8 inches.....	4 feet.
(b) Aft.....	3 feet 6 inches.....	3 feet 1 inch.....	2 feet 1 inch.....	4 feet.
6. Displacement.....	300 tons.....	195 tons.....	150 tons.....	224 tons.
7. Builder:				
(a) Hull and material of hull.....	United States, wood.....	St. Helens Shipbuilding Co., wood.....	Wood ¹	Bacrus Co., South Milwaukee, Wis., wood.
(b) Machinery.....	Furnished by various firms.....	Willamette Iron & Steel Works.....	Unknown.....	Do.
8. Where built.....	Dams Nos. 21 and 28, Ohio River.....	Hull and house, St. Helens, Oreg.; machinery, Portland, Oreg.....	Portage, Wis.....	Hull, Green Bay; machinery, South Milwaukee.
9. When built.....	1915.....	1915.....	1878.....	1908-9.
10. Time to build.....	4 months.....	140 calendar days.....	Unknown.....	1 year 3 months.
11. Contract cost.....	\$17,062.07.....	\$27,530.....	Unknown.....	\$27,500.
12. Finished cost with outfit (exclusive of barges, tugs, and launches).		\$29,243.33.....		\$28,020.
13. Where purchased.....				
14. When purchased.....				
15. From whom purchased.....				
16. Purchase price.....				
17. Bucket:				
(a) Type.....	23 digging buckets.....	Clamshell.....	Grapple (Lancaster).....	Chain buckets with teeth.
(b) Capacity.....	54 cubic feet each.....	14 cubic yards.....	24 cubic yards.....	28 buckets, 3 cubic feet each.
18. Length of boom and material.....	Two, 55 feet 6 inches each.....	70 feet; wood.....	60 feet; wood.....	No boom.
19. Maximum dredging depth.....	28 feet.....	16 feet.....		10 feet.
20. Dimensions of main hoisting-engine cylinders.....	Single cylinder, 104 by 36 inches.....	10 by 13 inches.....	8-inch diameter, 12-inch stroke.....	9-inch diameter, 12-inch stroke.
21. Dimensions of swinging engine.....	None.....	Main engine is used.....	None.....	6 by 6 inches.
22. Boilers:				
(a) Number.....	1.....	1.....	1.....	1.
(b) Type.....	Return tubular.....	Scotch marine.....	Scotch marine; Adamsen furnace 38 inches diameter.....	Scotch marine, with 2 Adamsen furnaces.
(c) Dimensions.....	6 feet diameter, 13 feet long.....	Length, 11 feet; diameter, 7 feet 6 inches.....	10 feet 8 inches long; 84 inches diameter.....	10 feet long, 108 inches diameter.
(d) Number, diameter, and length of tubes in one boiler.....	82, 3 by 138 inches; 46, 4 by 74 inches.....	98 of 3 inches by 8 feet 6 inches.....	80, 3 inches diameter, 8 feet 6 inches long.....	160, 3 inches by 7 feet 6 inches.
(e) Heating surface (total).....	1,140 square feet.....	773 square feet.....	680 square feet.....	1,070 square feet.
(f) Grate surface (total).....	274 square feet.....	Oil burner.....	17 square feet.....	35 square feet.
(g) Working steam pressure.....	125 pounds.....	100 pounds.....	110 pounds.....	125 pounds.

TABLE VII.—*Report of operations of bucket dredges for the calendar year ending Dec. 31, 1916—Continued.*

Name, letter, or number.....	Mason.	Monticello.	Omo.	Oakbank.
ATTENDANT FLANT.				
<i>Tugboat.</i>				
23. Name of tug attached to dredge.....	Crosst.....	Woodland.....	Fox and Wolf.....	Fox and Wolf.
24. Owner.....	United States.....	United States.....	United States.....	United States.
25. Number of crew.....	7.....	4.....	Fox, 7; Wolf, 5.....	Fox, 7; Wolf, &
<i>Launches.</i>				
26. Name.....	None used.....	None.....	.....	.....
27. Number of crew.....	.....	.....	.....	.....
<i>Scows.</i>				
28. Number of scows in use.....	None used, various flats and barges being used indiscriminately.	None.....	2.....	5.
29. Type.....	.....	.....	Flat pontoon and barge.....	(1).
30. Capacity (each).....	.....	.....	Pontoon, 20 tons; barge, 30 tons.....	(1).
31. Identifying letters or numbers.....	.....	.....	No. 4 and barge Berlin.....	(2).
WORK PERFORMED.				
32. Location of dredging.....	1 to 1 mile below Dam No. 21, Ohio River.	Covills and Lewis Rivers, Wash.	Fox River improvement.....	Fox River improvement.
33. Average depth before dredging.....	4 feet.....	1 foot 6 inches.....	4.9 feet.....	5.2 feet.
34. Average depth after dredging.....	25 feet or less.....	4 feet.....	6.5 feet.....	7 feet.
35. Average width of cut.....	3 feet at the bottom.....	40 feet.....	60 feet.....	100 feet.
36. Total distance cut ahead by dredge in feet.....	Not used in continuous cut.....	19,416.....	10 feet (without moving dredge).	10 feet (without moving dredge).
37. Total amount dredged in cubic yards during year.....	(a) None..... (b) 13,900 (gravel); (3) 29 cents.....	(a) 127,063; (2) \$0.13.....	(a) 59,376; (3) 3.65 cents.....	(3) 108,348; (2) 6.05 cents.
(a) Rock; (1) unit cost.....	.....	.....	.....	.....
(b) Sand and mud; (2) unit cost.....	.....	.....	.....	.....
38. Average number of cubic yards dredged.....	142.....	814.5.....	647.....	740.
(a) per day.....	211.....	112.56.....	92.2.....	108.
(b) per hour.....	.....	.....	.....	.....
39. Maximum number of cubic yards dredged.....	573.....	1,099.....	1,360.....	1,111.
(a) in one day.....	72.....	150.....	168.....	130.
(b) in one hour.....	6.9.....	726.....	7.....	7.
40. Average number of hours worked per day.....	.....	.....	.....	.....

41. Total number of days upon which any dredging was done.	96. 1 mile.	136. Material deposited on bank, where practicable.	123. Material banked.	147. Material banked.
42. Average distance in miles from work to dump.	300.	None.		
43. Number of sows loaded during year.	3.			
44. Number of sows loaded per day.	3 hours.			
45. Average time to load one sow.	90.			
46. Average load in cubic yards per sow.	About 2 hours to unload with derrick boat.			
47. Number of sows per tow.	2.			
48. Character of dredged material and average percentage:				
(a) Mud.	66 1/2 per cent (gravel).			10.
(b) Rock.	33 1/2 per cent.			90.
(c) Sand.				
Distribution of effective working time in hours.				
49. Dredging.	Hours.	Minutes.	Hours.	Minutes.
50. Working on tug.	735		981	
51. Spudding up.	32		97	
52. Miscellaneous.	17		49	
Distribution of time lost in hours.				
53. Repairing:				
(a) Hull.	88		20	
(b) Machinery, and cleaning boiler.	200		41	
54. Bad weather.				
55. Changing location of plant.			82	
56. Delays.	455		4	
57. Sundays and holidays.	455		936	
58. Out of commission, nights.	8,056		6,256	
59. Miscellaneous.	4,200		384	
60. Total number of hours in year	8,784		8,784	
COST OF WORK.				
Dredge.				
61. Pay rolls.	\$1,374.46			
62. Coal.	764.12			
63. Supplies:				
(a) Subsistence.	121.55			
(b) Machinery.	128.14			
(c) Miscellaneous.				
		\$6,315.87	\$2,212.14	\$4,555.76
		1,854.24	353.32	1,306.22
		1,342.23	23.79	123.47
		452.22	15.64	17.51

TABLE VII.—Report of operations of bucket dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.....	Mason.	Montezuma.	Omsv.	Oakbrook.
COST OF WORK—continued.				
<i>Dredge—Continued.</i>				
64. Renewals or additions to outfit, property, and rope.....	\$120.08	\$322.58	.....	.....
65. Ordinary repairs:				
(a) Hull.....	448.17	942.25	\$1.00	\$25.65
(b) Machinery.....	739.37	101.18	4.27	76.08
66. Laundry, ice, miscellaneous.....	.....	134.89	.....	.....
67. Total.....	\$3,708.24	\$10,510.79	\$2,610.36	\$6,103.06
<i>Towboat.</i>				
68. Operating cost for year.....	(1)	4,491.09	613.49	479.96
69. Ordinary repairs.....	(1)	.....	.....	.....
Total.....	.....	4,491.09	613.49	479.96
<i>Barges and scows.</i>				
70. Ordinary repairs.....	310.19	.....	.....	.....
71. Total.....	310.19	.....	.....	.....
72. Total field cost.....	\$4,036.53	\$15,001.88	\$3,223.85	\$6,583.02
<i>Gross cost.</i>				
73. Office expenses, superintendence, surveys, etc.....	.....	.....	.....	96.00
74. Extraordinary repairs to dredge:				
(a) Hull.....	(2)	.....	85.00	161.11
(b) Machinery.....	(3)	.....	.....	1,064.44
75. Extraordinary repairs to towboats and launches.....	(1)	.....	.....	.....
76. Extraordinary repairs to barges and scows.....	(1)	.....	25.53	1,883.20
77. Grand total.....	4,036.53	16,672.99	3,740.26	10,677.37

Cost per cubic yard.				
75. Field cost per cubic yard:				
(a) Mud or sand.....	29 cents (sand and gravel).	\$0.118.	3.06 cents.	6.05 cents.
(b) Rock.....				
76. Gross cost per cubic yard:	29 cents (sand and gravel).	\$0.120.	4.19 cents.	9.51 cents.
(a) Mud or sand.....				
(b) Rock.....				
<i>Miscellaneous.</i>				
80. Fuel consumed by dredge in long tons.	242.	140.02 1.	51.47.	305.35.
81. Fuel consumed by auxiliary plant in long tons.		108.24 1.		
82. Cost per hour of effective working time	\$5.12.	\$14,679.	\$3.16.	\$0.14.
83. Cost of fuel per ton.	\$3.24.	\$6,288.	\$4.34.	\$4.27.
84. Number of days in commission.	196.	238.	206.	207.
	<i>Remarks.</i>	<i>Remarks.</i>	<i>Remarks.</i>	<i>Remarks.</i>
	No attendant drill boats employed. This dredge was used to dig sand and gravel for concrete, therefore was not run to full capacity. Concrete use in construction of Lock and Dam No. 21, Ohio River. 1 See report for Crozet. 2 None.	1 No drill boats in attendance. 1 Fuel oil.	1 Rebuilt by United States in 1907-8.	1 2 flat carrying conveyors, 2 flat 20-ton pontoons, and one 200-ton coal barge. 2 Flat carrying conveyors 50 tons each, flat pontoons 20 tons each, coal barge 200 tons. 3 Delivery scow; intermediate Scow No. 2; pontoon scows Nos. 2 and 3, and barge Kaukauna.

TABLE VII.—*Report of operations of bucket dredges for the calendar year ending Dec. 31, 1916—Continued.*

Name, letter, or number.	Racetrans.	Saginaw.	Scuppernon.
1. District.....	Wheeling, W. Va.....	Grand Rapids, Mich.....	Wilmington, N. C.
2. Length.....	111 feet.....	83 feet 9 inches ¹	78 feet.....
3. Beam.....	22 feet (28 feet 6 inches over all).....	26 feet (32 feet outside of spuds) ¹	32 feet.....
4. Depth.....	5 feet.....	6 feet 7 inches ¹	7 feet.....
5. Draft:			
(a) Forward.....	3 feet.....	3 feet 3 inches ¹	2 feet 3 inches.....
(b) Aft.....	3 feet.....	2 feet 11 inches ¹	2 feet 8 inches.....
6. Displacement.....	200 tons.....	52 tons ¹	128 tons.....
7. Bufler:			
(a) Hull and material of hull.....	Ohio River Contract Co.; wood.....		U. S. Engineer Department.
(b) Machinery.....	Goodman Engine & Machine Co.....		New Jersey Foundry & Machine Co.
8. Where built.....	Dam No. 3, Ohio River.....		Newbern, N. C.
9. When built.....	1907.....		1904.....
10. Time to build.....	4 months.....		6 months.....
11. Contract cost.....	Unknown.....		Built by U. S. Engineer Department at
12. Finished cost with outfit (exclusive of barges, tugs, and launches).....	do.....		\$10,300.....
13. Where purchased.....	Dam No. 26, Ohio River.....	East Saginaw, Mich.....	\$10,700.....
14. When purchased.....	1910.....	1901.....	
15. From whom purchased.....	Ohio River Contract Co.....	Curtin, Stickney & Crum.....	
16. Purchase price.....	\$12,000.....	\$18,000 ¹	
17. Buvel:			
(a) Type.....	26 diering buckets.....	Orange peel.....	Orange peel.....
(b) Capacity.....	4 bushels each.....	14 cubic yards.....	21 cubic yards.....
18. Length of boom and material.....	65 feet; wood.....	70 feet; material, wood.....	26 feet; wood.....
19. Maximum dredging depth.....	26 feet.....	26 feet; depends on length of cable in use.....	About 15 feet.....
20. Dimensions of main hoisting-engine cylinders.....	9 by 36 inches.....	94 by 16 inches.....	7 by 12 inches.....
21. Dimensions of swinging engine.....	None.....	Double, 8 inches diameter, 9-inch stroke.....	None.....
22. Boilers:			
(a) Number.....	1.....	1.....	1.....
(b) Type.....	Cylindrical fire.....	Stationary tubular.....	Scotch marine.....
(c) Dimensions.....	46 inches by 20 feet.....	12 feet 6 inches by 50 inches.....	Diameter, 8 feet; length, 10 feet.....
(d) Number, diameter, and length of tubes in one boiler.....	6; 9 inches; 20 feet.....	64; 3 inches by 9 feet 6 inches and 33 feet 4 inches by 4 feet 6 inches.....	108; 34 inches by 8 feet.....
(e) Heating surface (total).....	434 square feet.....	632 square feet.....	125 square feet.....
(f) Grate surface (total).....	25 square feet.....	20 square feet.....	225 square feet.....
(g) Working steam pressure.....	150 pounds.....	100 pounds.....	150 pounds.....

ATTENDANT PLANT.

Footest.

22. Name of tug attached to dredge.

23. Owner.

24. Number of crew.

Leaves.

25. Name.

26. Number of crew.

Scows.

27. Number of scows in use.

28. Type.

29. Capacity (each).

30. Identifying letters or numbers.

WORK PERFORMED.

31. Location of dredging.

32. Average depth before dredging.

33. Average depth after dredging.

34. Average width of cut.

35. Total distance cut ahead by dredge, in feet.

36. Total amount dredged, in cubic yards during year.

37. (a) Rock; (1) unit cost.

(b) Sand and mud; (2) unit cost.

38. Average number of cubic yards dredged:

(a) Per day.

(b) Per hour.

39. Maximum number of cubic yards dredged:

(a) In one day.

(b) In one hour.

40. Average number of hours worked per day.

41. Total number of days upon which any dredging was done.

42. Average distance in miles from work to dump.

43. Number of scows loaded during year.

44. Number of scows loaded per day.

45. Average time to load one scow.

46. Average load in cubic yards per scow.

47. Average time to tow load to dump and return.

48. Number of scows per tow.

General Crisfield, United States 7	Gen. Gilmore, United States 8 when towing; operated by dredge crew.	None.
None.	No launch used.	None.
None; 9 facts and barges pertaining to this work are used indiscriminately.	Deck for carrying coal 10 tons (8 No. IX.	None.
1 to 2 miles from work.	Grand River, Muskegon Harbor, and Grand Haven Harbor, Mich.	Out of commission.
6 feet.	Grand River, 5 feet.	
25 feet or less, depending on elevation of rock.	Grand River, 8 feet.	
3 feet at bottom.	Grand River, 30 feet to 70 feet.	
Not applicable to sand digger.	Grand River, 5,450 feet.	
(a) 21,380 gravel; (1) 23; cents	(b) 23,300 cubic yards; 3 (2) field, 15.6 cents; gross, 21.7 cents.	
370 (in good digging)	557 cubic yards, place measurement.	
40 (in good digging)	75 cubic yards, place measurement.	
450.	888 cubic yards, place measurement.	
56.	111 cubic yards, place measurement.	
8.	7.2	
101.	140.	
Not applicable in case of sand digger.		
513.		
41 for 8-hour shift when working.		
21 hours for gravel; 5 hours for sand.		
50 yards gravel; 60 to 65 yards of sand.		
Not applicable in case of sand digger.		
2 and 3.		

TABLE VII.—Report of operations of bucket dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.	Work performed—continued.	Hours.	Minutes.	Rocness.	Safiness.	Scuppernon.
48.	Character of dredged material and average percentage: (a) Mud..... (b) Rock..... (c) Sand.....			None..... do..... 33½ per cent sand; 66½ per cent gravel..		
	Distribution of effective working time in hours.	7				
49.	Dredging.....				1,001	
50.	Waiting on tug.....		30			30
51.	Spudding up.....		20		55	
52.	Miscellaneous.....					
	Distribution of time lost in hours.					
53.	Repairing:					
(a)	Hull.....	()			6	
(b)	Machinery, and cleaning boiler.....	()			26	
54.	Bad weather.....	()			22	30
55.	Changing location of plant.....	()			63	15
56.	De ave.....	()				
57.	Sinovee and no idays.....	()			295	
58.	Out of commission, nights.....	()			6,684	
59.	Miscellaneous.....	()			105	15
60.	Total number of boats in year.....	8,760			8,764	8,764
	COST OF WORK.					
	Dredge.					
61.	Pay rolls.....	\$3,229.44			\$3,231.60	\$807.78
62.	Coal.....	1,023.64			841.97	
63.	Supplies:					
(a)	Substance.....	62.24			87.34	
(b)	Machinery.....	44.46			302.45	12.46
(c)	Miscellaneous.....	28.60			22.31	2.75
64.	Renovals or additions to outfit, property, and rope.....	331.20				

65. Ordinary repairs:					
(a) Hull.....	1,994.95	45.79	12.15		
(b) Machinery.....	1,505.21	942.83	230.17		
66. Laundry, ice, miscellaneous.....	54.77	19.28	2.42		
67. Total.....	\$3,350.09	\$4,945.37			\$507.76
<i>Towboat.</i>					
68. Operating cost for year.....		1,081.10			
69. Ordinary repairs.....		143.52			
Total.....		1,224.62			
<i>Barges and scows.</i>					
70. Ordinary repairs.....	789.47				
71. Total.....	789.47				
72. Total field cost.....	\$9,139.56			\$9,169.99	
<i>Gross cost.</i>					
73. Office expenses, superintendence, surveys, etc.....				1,067.17	
74. Extraordinary repairs to dredge:				4,255.56	
(a) Hull.....				574.42	
(b) Machinery.....				62.16	
75. Extraordinary repairs to towboats and launches.....					
76. Extraordinary repairs to barges and scows.....					
77. Grand total.....	9,139.56			12,440.20	
<i>Cost per cubic yard.</i>					
78. Field cost per cubic yard:					
(a) Mud or sand.....	29 1/2 cents for sand and gravel	16.6 cents			
(b) Rock.....					
79. Gross cost per cubic yard:					
(a) Mud or sand.....		20.7 cents			
(b) Rock.....	29 1/2 cents				

TABLE VII.—*Report of operations of bucket dredges for the calendar year ending Dec. 31, 1916—Continued.*

Name, letter, or number.....	Rosecrans.	Sigsbee.	Scuppernon.
COST OF WORK—continued.			
<i>Miscellaneous.</i>			
80. Fuel consumed by dredge in long tons.....	542.....	173.7.....	
81. Fuel consumed by auxiliary plant in long tons.....	See report for steamer Craigbill.....	50.....	
82. Cost per hour of effective working time.....	Not applicable in this case. ¹	\$5.84.....	
83. Cost of fuel per ton.....	\$1.66 to \$3.50 per short ton.....	\$4.845.....	
84. Number of days in commission.....	133.....	223.....	
	<p>Remarks.</p> <p>¹ Have no data because of the nature of the employment of this craft.</p> <p>² The Rosecrans is a ladder-type sand digger and not a dredge. For that reason a considerable portion of the data required on this form does not apply in this case. This boat was employed at Dam No. 22, Ohio River, digging sand and gravel for construction work.</p>	<p>Remarks.</p> <p>¹ As rebuilt by United States in 1905; originally 90 by 28 by 8 feet.</p> <p>² Purchased as a dipper dredge from Carlin, Stickney & Cram, of East Saginaw, Mich., in 1891, for \$18,000. Rebuilt as a derrick by the United States at Grand Haven, Mich., in 1906, at a cost of \$4,571.</p> <p>³ In work at Muskegon Harbor was dredging material from channel and building break along channel face of revetments. The work at Grand Haven was back filling at south revetment and removing piles from north revetment.</p> <p>⁴ Does not include cleaning boiler, which was done on Sundays and holidays.</p> <p>⁵ Includes 143 days of 24 hours each on which the dredge was out of commission.</p>	

Name, letter, or number.....		Tidal gauge.....	No. 1.	No. 151
1. District.....	Chattanooga, Tenn.....	Chattanooga, Tenn.....	Kansas City, Mo.....	Montgomery, Ala.
2. Length.....	100 feet.....	100 feet.....	92 feet.....	80 feet.
3. Beam.....	44 feet.....	44 feet.....	30 feet.....	22 feet.
4. Depth.....	Forward, 5 feet 6 inches; aft, 5 feet 7 inches.	Forward, 5 feet 6 inches; aft, 5 feet 7 inches.	4 feet 4 inches.....	4 feet 2 inches.
5. Draft:				
(a) Forward.....	3 feet 8 inches.....	3 feet 8 inches.....	1 foot 6 inches.....	1 foot.
(b) Aft.....	3 feet.....	3 feet.....	1 foot 6 inches.....	1 foot.
6. Displacement.....	481 long tons.....	481 long tons.....	120 long tons.....	30 tons.
7. Builder:				
(a) Hull and material of hull.....	U. S. Engineer Department; wood.	U. S. Engineer Department; wood.	United States.....	U. S. Engineer Department; wood.
(b) Machinery.....	Vulcan Steam Shovel Co.	Vulcan Steam Shovel Co.		Thomas Carlin's Sons (boiling engine).
8. Where built.....	Hull, Muscle Shoals Canal, Ala.....	Hull, Muscle Shoals Canal, Ala.....	Rebuilt, 1911, at Lock and Dam No. 1, Osage River.	Gulfport, Miss.
9. When built.....	1912.....	1912.....	8 months.....	No record.
10. Time to build.....	12 months.....	12 months.....		\$4,007.50.
11. Contract cost.....	Machinery, \$16,225.....	Machinery, \$16,225.....		
12. Finished cost with outfit (exclusive of barges, tugs, and launches).....	\$37,063.....	\$37,063.....		
13. Where purchased.....	Machinery, Toledo, Ohio.....	Machinery, Toledo, Ohio.....		
14. When purchased.....	Machinery, 1912.....	Machinery, 1912.....		
15. From whom purchased.....	Machinery, Vulcan Steam Shovel Co.	Machinery, Vulcan Steam Shovel Co.		
16. Purchase price.....				
17. Bucket:				
(a) Type.....	Orange pool.....	Orange pool.....	Clamshell; orange pool.....	Clamshell.
(b) Capacity.....	2 cubic yards.....	2 cubic yards.....	Clamshell, 1 cubic yard; orange pool, 1 cubic yard.	1 yard.
18. Length of boom and material.....	100 feet (steel).....	100 feet (steel).....	80 feet.....	80 feet; pine.
19. Maximum dredging depth.....	16 feet.....	16 feet.....	8 feet.....	4 feet.
20. Dimensions of main hoisting-engine cylinders.....	12 by 16 inches.....	12 by 16 inches.....	7 by 12 inches.....	8 by 10 inches.
21. Dimensions of swinging engine.....	7 by 10 inches.....	7 by 10 inches.....		Do.
22. Boilers:				
(a) Number.....	1.....	1.....		1.
(b) Type.....	Locomotive.....	Locomotive.....	Firebox.....	Upright.
(c) Dimensions.....	60 inches diameter, 16 feet long.....	60 inches diameter, 16 feet long.....	4 feet by 15 feet 11 inches.....	4 by 8 feet.
(d) Number, diameter, and length of tubes in one boiler.....	116; 2 1/2 inches diameter, 11 feet long.....	116; 2 1/2 inches diameter, 11 feet long.....	64; 3 inches, 9 feet 5 inches long.....	108; 1 1/2-inch tubes, 6 feet long.
(e) Heating surface (total).....	995 square feet.....	995 square feet.....	405 square feet.....	477 square feet.
(f) Grate surface (total).....	16 square feet.....	16 square feet.....	16.75 square feet.....	11 square feet.
(g) Working steam pressure.....	125 pounds.....	125 pounds.....	100 pounds.....	90 pounds.

TABLE VII.—Report of operations of bucket dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.....	Tidegauge.	No. 1.	No. 16
ATTENDANT PLANT.			
<i>Towboat.</i>			
23. Name of tug attached to dredge.....	McPherson and Colbert.....	U. S. steamer Osage.....	None.
24. Owner.....	U. S. Engineer Department.....	United States.....	
25. Number of crew.....		4.....	
<i>Launches.</i>			
26. Name.....	No. 6.....	Rocket.....	Do.
27. Number of crew.....	1.....	1.....	
<i>Scows.</i>			
28. Number of scows in use.....	Scows not used.....		Do.
29. Type.....			
30. Capacity (cush).....			
31. Identifying letters or numbers.....			
WORK PERFORMED.			
32. Location of dredging.....	Big Bend Shoals.....	Upper Osage River, miles 84-90.....	Cross River Ala., between Dam No. 5 and Fan Trap Shoals.
33. Average depth before dredging.....	20 inches at low water.....	1.6 feet.....	2.5 feet.
34. Average depth after dredging.....	5 feet at low water.....	3.4 feet.....	30 feet.
35. Average width of cut.....	150 feet.....	55 feet.....	300.
36. Total distance cut along by dredge in feet.....	21,452.....	4,181.....	
37. Total distance dredged in cubic yards during year:			
(a) Rock; (1) unit cast.....	(a) 38,094; (1) 37 cents.....	(a) None.....	(a) 289; (1) 80.2322.
(b) Sand and mud; (2) unit cast.....		(b) 16,220 cubic yards.....	(b) None; (2) none.
38. Average number of cubic yards dredged:			
(a) Per hour.....	224 rock.....	175.....	62.4 cubic yards.
(b) Per day.....	17.3 rock.....	29.....	7.5 cubic yards.
39. Maximum number of cubic yards dredged:			
(a) In one day.....	1,600 rock.....	380.....	76 cubic yards.
(b) In one hour.....	240 rock.....	47.5.....	12 cubic yards.
40. Average number of hours worked per day.....	13.....	16.7.....	8.
41. Total number of days upon which any dredging was done.....	173.....	45.....	4.
42. Average distance in miles from work to dump.....	Material was cast.....	Gravel wasted to one side.....	None.
43. Number of scows loaded during year.....	None.....	None.....	1th.
44. Number of scows loaded per day.....	do.....	do.....	
45. Average time to load one 400 cu. yd. scow.....	do.....	do.....	
46. Average load in cubic yards per scow.....	do.....	do.....	
47. Average time to tow load to dump and return.....	do.....	do.....	
48. Number of scows per tow.....	do.....	do.....	

48. Character of dredged material and average percentage: (a) Mud. (b) Rock. (c) Sand.	None. 100 per cent. None.		do. do. 100 per cent.		Do. 100 per cent. None.	
	Hours.	Minutes.	Hours.	Minutes.	Hours.	Minutes.
<i>Dredging of effective working time in hours.</i>						
49. Dredging.....	2,194	15	708	None.	83	None.
50. Waiting on tug.....	5	45	None.	None.	None.	None.
51. Spudding up.....	58		None.	None.	1,683	None.
52. Miscellaneous.....			None.	None.		
<i>Distribution of time lost in hours.</i>						
53. Repairing:						
(a) Hull.....	23		None.	None.	16	None.
(b) Machinery and cleaning boiler.....	3,163	50	None.	None.	40	None.
54. Bad weather.....	9	10	None.	None.	200	None.
55. Changing location of plant.....	16		48	None.	19	None.
56. Delays.....	1,440		1,038	None.		
57. Sundays and holidays.....	1,440		1,038	None.	930	None.
58. Out of commission, night.....	1,579		2,338	None.	3,038	None.
59. Miscellaneous.....			None.	None.	1,976	None.
60. Total number of hours in year.....	8,784		8,784	366 days.	8,784	
COST OF WORK.						
<i>Dredge.</i>						
61. Pay rolls.....	\$4,087.90		\$781.79		\$1,996.22	
62. Coal.....	1,375.80		161.88		214.08	
63. Supplies:						
(a) Subsistence.....	1,027.66		261.92		416.45	
(b) Machinery.....	142.45		17.75		184.12	
(c) Miscellaneous.....	451.10				15.25	
64. Renewals or additions to outfit, property, and rope.....						
65. Ordinary repairs:						
(a) Hull.....	806.25		11.56		94.10	
(b) Machinery.....	1,398.23		92.50		257.16	
66. Laundry, ice, miscellaneous.....	151.00					
67. Total.....	\$9,440.45		\$1,327.40		\$3,182.39	
<i>Towboat.</i>						
68. Operating cost for year.....	\$5,249.45				None.	
69. Ordinary repairs.....	835.50					
Total.....	4,084.95					

TABLE VII.—Report of operations of bucket dredges for the calendar year ending Dec. 31, 1916—Continued.

Name, letter, or number.....	Thakominge.	No. 1.	No. 16.
COST OF WORK—continued.			
<i>Barges and scows.</i>			
70. Ordinary repairs.....	\$84.40	None.	None.
71. Total.....	84.40	None.	3,182.39
72. Total field cost.....	\$13,609.88	\$1,327.40	\$3,182.39
<i>Gross cost.</i>			
73. Office expenses, superintendence, surveys, etc.....			379.12
74. Extraordinary repairs to dredge:	\$812.29	402.48	494.20
(a) Hull.....			
(b) Machinery.....			
75. Extraordinary repairs to towboats and launches.....			
76. Extraordinary repairs to barges and scows.....			
77. Grand total.....	14,422.12	1,789.88	4,046.71
<i>Cost per cubic yard.</i>			
78. Field cost per cubic yard:			
(a) Mud or sand.....		\$0.0855	\$0.2632
(b) Rock.....			
79. Gross cost per cubic yard:			
(a) Mud or sand.....		\$0.1183	\$0.2362
(b) Rock.....			
<i>Miscellaneous.</i>			
80. Fuel consumed by dredges in long tons.....	492	Also, 403 cords wood; 16 tons coal.....	76.077.
81. Fuel consumed by auxiliary plant in long tons.....			
82. Cost per hour of effective working time.....	\$6.42	\$2.038.	\$2.038.
83. Cost of fuel per ton.....	\$2.796	Wood, \$2.25; coal, \$4.32.....	\$2.814.
84. Number of days in commission.....	366		
	<i>Remarks.</i>	<i>Remarks.</i>	<i>Remarks.</i>
	Operations of drill units 2-8 and 4-8 are not included in above costs. ! Includes towboats and launches. ! Includes repairs to quarter boats. ! Includes field, Nashville and Cincinnati office, expenses.	! Included in foregoing.	This boat was employed throughout the greater part of its working time in assisting in the construction of cofferdams at Dam No. 5, Coosa River, Ala. The total field cost of dredging was \$69.30 and the total gross cost of dredging was \$23.20. There was no attendant drill boat. ! Formerly barge No. 15.

TABLE VIII.

SNAG BOATS.

4235

TABLE VIII.—Report of operations of snag boats for the calendar year ending Dec. 31, 1916.

Name.....	A ransas.	Chattahoochee.	Choctawhatchee.	Columbia.	Conasa.
1. District.....	Little Rock, Ark.	Montgomery, Ala.	Montgomery, Ala.	Viola, Miss.	Montgomery, Ala.
2. Length over all.....	155 feet 6 inches.	183 feet.	90 feet.	137 feet 4 inches.	60 feet.
3. Length of hull.....	140 feet.	140 feet.	80 feet.	121 feet 8 inches.	60 feet.
4. Length on water line.....	130 feet 6 inches.	130 feet.	80 feet.	115 feet 8 inches.	60 feet.
5. Beam over all.....	31 feet.	27 feet.	22 feet.	27 feet.	20 feet.
6. Beam at load water line.....	30 feet.	26 feet 6 inches.	22 feet.	27 feet.	20 feet.
7. Depth.....	4 feet 6 inches.	4 feet.	3 feet 6 inches.	4 feet.	3 feet.
8. Draft.....	(a) Forward (b) Aft	2 feet 1 inch. 2 feet 6 inches.	1 foot 10 inches. 2 feet.	1 foot 6 inches. 2 feet 6 inches.	1 foot 6 inches. 1 foot 6 inches.
9. Displacement.....	240 tons.	243 long tons.	197 tons.	136 87 long tons.	37 tons.
10. Builder.....	M. A. Sweeney Shipyard & Foundry Co., Jeffersonville, Ind.	U. S. Engineer Department; hired labor.	U. S. Engineer Department.	Not known.	U. S. Engineer Department.
11. Where built.....	Jeffersonville, Ind.	Burlock's Landing, Ala., Chattahoochee River.	Pine Barren, Fla.	Gainesville, Miss.	River Falls, Ala.
12. When built.....	1900.	1898.	1902-3.	1877.	1907.
13. Time to build.....	1 year.	13 months.	No record.	Wood.	6 months.
14. Material of hull.....	Steel.	Wood.	Wood, yellow pine.	Wood.	Wood, yellow pine.
15. Contract cost.....	\$32,500, including outfit.	Built by hired labor.	Built by hired labor.	Built by hired labor.	Built by hired labor.
16. Finished cost with outfit.....	\$32,500.	\$12,000.	\$5,400.	\$1,800.	\$1,250.
17. Bucket.....	(a) Type (b) Capacity	None.	None.	None.	None.
18. Height of gallova frame.....	do.	25 feet.	25 feet.	Shear legs, 30 feet above deck.	24 feet.
19. Length of boom and material.....	None.	30 feet, wood.	None.	None.	None.
20. Capacity.....	25 tons.	20 tons.	22 tons.	50 tons (shear legs).	28 tons.
21. Capacity of machine per hour while bucket is dragging.....	No dredging equipment.	None.	None.	None.	None.
22. Dimensions of main hoisting-engine cylinders.....	Four 8 by 8 inches.	2 cylinders, 4 by 8 inches.	7 by 12 inches, double.	8 inches diameter, 14 inches stroke.	Do.
23. Dimensions of swinging engine.....	None.	7 by 8 inches.	5 by 12 inches.	None.	Do.
24. Dimensions of propelling-engine cylinders.....	10 inches by 4 feet 6 inches.	15 inches diameter, 4-foot stroke.	9 by 36 inches.	12-inch diameter, 38-inch stroke.	Do.
25. Side & stern wheel.....	Stern.	Stern wheel.	Stern wheel.	8 1/2 ft.	Do.
26. Diameter of wheel.....	12 feet.	18 feet.	18 feet.	15 feet.	Do.
27. Length and width of hull.....	15 feet 8 inches by 15 inches.	19 feet by 24 inches.	11 feet long, 12 inches wide.	15 feet long, 18 inches wide.	Do.
28. Location of shaft.....	61 inches.	51 inches.	24 inches.	5 inches.	Do.
29. Revolutions per minute.....	5 (average).	12.	24.	22.	Do.
30. Speed in miles per hour.....	5 (average).	5.	14.	9 miles (average).	Do.

FLOATING PLANT.

4237

31. Boilers.	2. 6-tube Mississippi River. Five 8-inch.	3. Western River. 2; diameter, 12 inches.	1. Water-back. 48 flues; 3-inch diameter.	1. Mississippi River, flue. Two 12-inch and four 8-inch.	Do.
(a) Number.....	40 inches by 20 feet.....	Diameter, 40 inches; length, 20 feet.	14 feet 9 inches by 73 inches.	20 feet long, 48 inches diameter.	Do.
(b) Type.....	746 square feet.....	483.2 square feet.	409 square feet.	488 square feet.	Do.
(c) Number and diameter of flues in one boiler and length.....	32 square feet.....	54 square feet.	14 square feet.	24 square feet.	Do.
(d) Diameter and length.....	165 pounds.....	190 pounds.....	96 pounds.....	140 pounds.....	Do.
(e) Heating surface (total).	\$9,815.79	\$9,167.79	\$2,162.44	\$734.50	\$1,847.35
(f) Grate surface (total).	1,975.11	1,317.53	166.70		
(g) Working pressure.....	(1) 83.95	20.95	7.72	8.20	3.39
OPERATING COST.	(b) Lubricating.....	29.07	6.75		1.00
32. Pay roll.....	(c) Substenance.....	2,345.17	543.25		463.63
33. Fuel.....	(d) Machinery.....	169.87	72.99		5.29
34. Oil:	(e) Miscellaneous.....	1,540.74	24.32	8.10	148.19
(a) Kerosene.....	263.88	899.10	178.34		19.84
(b) Lubricating.....	400.25	87.81	236.85		8.21
35. Supplies:	100.45	358.07	13.89		
(a) Substenance.....					
(b) Machinery.....					
(c) Miscellaneous.....					
36. Renewals or additions at outfit.....					
37. Ordinary repairs.....					
38. Laundry, ice, and miscellaneous.....					
39. Total field cost.....	\$14,980.89	\$15,851.89	\$3,412.25	\$750.80	\$2,490.55
40. Extraordinary repairs.....	59.89	142.50	1,575.94		461.5
41. Office expenses.....	751.35	987.95	437.43	15.01	480.65
42. Gross cost.....	16,121.98	16,932.34	5,425.62	765.81	3,391.5
43. Work done during the year and where operated.....	Indeterminate.	None.	See remarks.	See remarks.	See remarks.
44. Gross cost per obstruction.....	No dredging equipment.	162.	\$1.55		\$1.77
45. Gross cost per cubic yard of dredged material.....			\$0.113		\$0.72
46. Number of days under steam.....			106		107.

TABLE VIII.—*Report of operations of snag boats for the calendar year ending Dec. 31, 1916—Continued.*

Name	Artesians.	Chattahoochee.	Choctawhatchee.	Okefenokee.	Comments.
	<p>Remarks.</p> <p>1 Kerene and 100 included in subsistence; laundry in pay roll.</p> <p>2 508 snags removed from channel; 2 drift rafts broken and 719 trees cut in Arkansas River.</p> <p>Also worked 20 days as drags tender to Arkansas River drags and 30 days with survey party.</p>	<p>Remarks.</p> <p>This item of plant was engaged during the year in filling jetties with brush and stones at the mouth of the Apalachicola River, Fla., and on the Chattahoochee River, Ga. and Ala.</p> <p>During the year also placed 3,338 cords of brush and 3,282 cubic yards of stone.</p>	<p>Remarks.</p> <p>This plant was employed during January in snagging on the Holmes River, Fla.; during February and March was on dock in Pensacola, Fla., undergoing extraordinary repairs; during the latter part of March and April was employed in dragging Cypress Top Outlet at the mouth of Choctawhatchee River; during May, June, and July was tied up, owing to lack of funds; made some repairs during October and November; dragged at Cypress Top Outlet during December.</p> <p>Removed 620 obstructions, including trees and cords of brush cut from bank; dragged 14,727 cubic yards of material from Cypress Top Outlet.</p>	<p>Remarks.</p> <p>Owing to the bad condition of its hull this boat was laid up during the entire year.</p>	<p>Remarks.</p> <p>This plant was employed during January in snagging on the Holmes River, Fla., between miles 14 and 17; was tied up, owing to lack of funds, from February to August, inclusive; was employed in snagging operations on the Choctawhatchee River, Fla., between miles 33 and 60, during September, October and November; during the latter part of November and December worked the entire Holmes River from Vernon to its mouth, a distance of 24 miles.</p> <p>Removed 1,809 obstructions, including trees and cords of brush cut from bank; dragging consisted in blasting and snoveling 88 cubic yards of sand from the points in Holmes River, Fla.</p>

Name.....	Culberson.	Dallas.	Demopolis.	Denton.	Excelsior.
1. District.....	Dallas, Tex.	New Orleans, La.	Mobile, Ala.	Dallas, Tex.	Montgomery, Ala.
2. Length over all.....	125 feet.	168 feet.	82 feet 10 inches.	136 feet.	92 feet.
3. Length of hull.....	106 feet.	112 feet.	82 feet 2 inches.	120 feet.	82 feet.
4. Length on water line.....	98 feet 9 inches.	110 feet.	74 feet 7 inches.	117 feet.	82 feet.
5. Beam over all.....	30 feet 8 inches.	30 feet 8 inches.	25 feet 7 inches.	33 feet 7 inches.	25 feet.
6. Beam at load water line.....	28 feet.	30 feet.	25 feet.	33 feet.	25 feet.
7. Depth.....	5 feet.	5 feet.	4 feet.	4 feet 6 inches.	4 feet.
8. Draft:					
(a) Forward.....	3 feet 1 inch.	4 feet.	1 foot 10 inches.	2 feet 7 inches.	1 foot 8 inches.
(b) Aft.....	3 feet 7 inches.	4 feet 2 inches.	1 foot 11 inches.	2 feet 9 inches.	1 foot 10 inches.
9. Displacement.....	390 long tons.	390 long tons.	96 tons.	112 tons.	112 tons.
10. Builder.....	M. A. Sweeney & Co.	M. A. Sweeney Shipyard & Foundry Co.	William Foster.	Dubuque Boat & Boiler Works.	U. S. Engineer Department.
11. Where built.....	Jeffersonville, Ind.	Jeffersonville, Ind.	Mobile, Ala.	Dubuque, Iowa.	Pine Barren, Fla.
12. When built.....	1907.	1903-9.	1891.	1915.	1909.
13. Time to build.....	18 months.	18 months.	Not known.	7 months.	7 months.
14. Material of hull.....	Long-leaf pine.	Wood.	Wood.	Steel.	Long-leaf yellow pine.
15. Contract cost.....		\$14,566.84.	\$4,087.		\$5,063.44 (dred labor).
16. Finished cost with outfit.....		\$35,566.84.			\$5,350.95.
17. Bucket:					
(a) Type.....		Orange peel.	No dredging outfit.	Clamshell.	None.
(b) Capacity.....		1 yard.		14 yards.	14 yards.
18. Height of galley's frame.....	30 feet.	32 feet.	20 feet 7 inches.	30 feet 6 inches.	32 feet.
19. Length of boom and material.....	39 feet, cypress.	60 feet.	45 feet, wood.	39 feet, pine.	None.
20. Capacity.....		10 tons.	18 tons.		45 tons.
21. Capacity of machine per hour while bucket dredging.....		80 yards.	No bucket.		None.
22. Dimensions of main hoisting-engine cylinders.....	10 feet by 12 inches.	10 by 12 inches.	2 cast-iron engines, 6 by 6 inches.	10 by 12 inches.	6 by 7 inches, double.
23. Dimensions of swinging engine.....		None used.	None.	61 by 8 inches.	5 by 7 inches.
24. Dimensions of propeller-engine cylinders.....	5 feet by 12 inches.	12 by 48 inches.	Nonpropelling.	12 inches by 5 feet 6 inches.	9 by 36 inches, double.
25. Side or stern wheel.....	Stern wheel.	Stern wheel.		Stern wheel.	Stern wheel.
26. Diameter of wheel.....	12 feet.	14 feet.	14 feet.	12 feet 6 inches.	12 feet.
27. Length and width of buckets.....	17 feet by 20 inches.	16 feet long, 14 inches wide.	22 feet 2 inches by 18 inches.	22 feet 2 inches by 18 inches.	13 feet long, 14 inches wide.
28. Least diameter of shaft.....	7 inches.	7 inches.	7 inches.	71 inches.	114 inches.
29. Revolutions per minute.....		18.	18.		58.
30. Speed in miles per hour.....		6.			54 miles.

TABLE VIII.—Report of operations of snag boats for the calendar year ending Dec. 31, 1916—Continued.

Name	Cuberson.	Delatour.	Demopolis.	Denton.	Escomb.
31. Boilers:					
(a) Number.	3.	3.	1.	2.	1.
(b) Type.	2 horizontal, 1 upright.	Mississippi River flue type.	Vertical tubular.	Horizontal return flue.	Horizontal return flue.
(c) Number and diameter of flues in one boiler.	10; 6 inches by 20 feet.	10; 6 inches diameter.	148; 2 inches.	34; 3 inches.	38; 3 inches diameter.
(d) Diameter and length.	44 inches by 20 feet.	One 42 inches and two 43 inches by 20 feet long.	53 inches (inside); 8 feet 6 inches.	44 inches by 16 feet.	13 feet 6 inches by 72 inches.
(e) Heating surface (total).	1,100 feet.	1,405.8 square feet.	350 square feet.	1,100 square feet.	380 square feet.
(f) Grate surface (total).	36 square feet.	48 square feet.	11.54 square feet.	38 square feet.	14 square feet.
(g) Working steam pressure.	175.	130 pounds.	90 pounds.	185 pounds.	90 pounds.
OPERATING COST.					
32. Pay roll.	\$5,638.05	\$1,064.82	\$1,756.17	\$6,198.71	\$2,099.84
33. Fuel.		192.88	111.84		44.30
34. Oil:					
(a) Kerosene.			9.32	20.89	5.50
(b) Lubricating.			35.96	36.36	4.60
35. Supplies:					
(a) Subsistence.	1,398.83	405.49	604.15	1,542.81	449.72
(b) Machinery.			35.20	120.00	29.72
(c) Miscellaneous.	260.25		244.63	371.24	14.38
36. Renewals or additions to outfit.			582.73		132.90
37. Ordinary repairs.			314.18	90.00	29.62
38. Laundry, ice, and miscellaneous.			22.89	110.00	11.37
39. Total field cost.	\$7,297.13	\$1,663.19	\$3,720.16	\$8,490.01	\$2,821.75
40. Extraordinary repairs.			558.49		868.87
41. Office expenses.	729.71		138.14	848.00	430.64
42. Gross cost.	8,026.84	1,663.19	4,416.79	9,338.01	4,121.26
43. Work done during the year and where operated.	Removed 503 snags; miles 0 to 84.	862 obstructions removed, Bayous Grossetete and Manchac, La.	(1).....	Removed 1,111 snags; miles 0 to 158.	See remarks.
44. Gross cost per obstruction.		\$1.98	\$6.05		\$2.05.

45. Gross cost per cubic yard of dredged material.	153.	Remarks. Boat laid up June 30, 1916. In addition to snags removed, there were 3,014 shore snags cut; 4 jams removed and 13,399 trees on caving banks cut.	76.	Remarks. Jan. 1 to July 4, laid up at Mobile on account of lack of funds. July 5 to Aug. 11, ashore from effect of hurricane of July 5. Aug. 12 to Oct. 1, at Pascagoula, Miss., at United States shipyard, undergoing repairs caused by storm. For the remainder of the year was operated at Mobile during which time 57 days were spent in assisting the dredge Wahalak in handling pontoons, pipe, etc., and in repairing storm damage to bulkhead; 35 days were spent in removing 336 obstructions from Mobile Ship Channel. * \$2,011.72 of total gross cost was spent in removing the 336 obstructions. The gross cost includes \$568.78 due to storm damage from hurricane of July 5.	175.	Remarks. Boat laid up June 30, 1916. In addition to snags removed, there were 1,555 shore snags cut, 9,921 leaning trees cut up, and fuel cut to run boat.	82.	Remarks. This item of plant worked during the year on the Holmes River, Fla., from mile 0 to 14, and on the Choctawhatchee River, Fla., from mile 0 to 34; was used in hauling groceries and supplies to snag boats Geneva and Conestoga; was under extraordinary repairs at Caryville, Fla., for one month. Removed 1,955 obstructions, including trees and cords of brush cut from bank.	None.
--	------	--	-----	--	------	---	-----	--	-------

TABLE VIII.—Report of operations of snag boats for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Escatawpa.	Flint.	Florence, Thos. B.	Geneva.	Howell, C. W.
1. District.....	Mobile, Ala.....	Montgomery, Ala.....	Vicksburg, Miss.....	Montgomery, Ala.....	Vicksburg, Miss.....
2. Length of overall.....	60 feet.....	110 feet.....	109 feet 6 inches.....	64 feet.....	165 feet.....
3. Length of hull.....	60 feet.....	94 feet.....	95 feet.....	64 feet.....	146 feet.....
4. Length on water line.....	58 feet.....	90 feet.....	95 feet 8 inches.....	62 feet.....	140 feet.....
5. Length of stern wheel.....	20 feet.....	25 feet 4 inches.....	22 feet 9 inches.....	22 feet 6 inches.....	36 feet.....
6. Beam of hull.....	20 feet.....	24 feet 11 inches.....	20 feet.....	22 feet.....	36 feet.....
7. Depth.....	4 feet.....	4 feet 3 inches.....	4 feet.....	4 feet 4 inches.....	5 feet.....
8. Draft.....	1 foot 10 inches.....	2 feet.....	1 foot 11 inches.....	1 foot 2 inches.....	2 feet 6 inches.....
(6) Alt.....	2 feet.....	2 feet 5 inches.....	2 feet 7 inches.....	1 foot 4 inches.....	3 feet 2 inches.....
9. Displacement.....	62 tons.....	138 tons.....	107 long tons.....	50 tons.....	304 46 long tons.....
10. Builder.....	U. S. Engineer Department.....	U. S. Engineer Department.....	Allen & Blaisdell.....	U. S. Engineer Department.....	Allen & Blaisdell.....
11. Where built.....	Hattiesburg, Miss.....	Time Barren, Fla.....	South St. Louis, Mo.....	Freeport, La.....	South St. Louis, Mo.....
12. When built.....	1910.....	1914.....	1875.....	1913.....	1881.....
13. Time to build.....	2 months.....	4 months.....	Not known.....	4 months.....	Not known.....
14. Material of hull.....	Wood.....	Wood.....	Iron and steel.....	Wood.....	Iron and steel.....
15. Contract cost.....	\$3,248.90.....	\$13,825.....	\$14,000.....	Built by hired labor.....	\$4,650.....
16. Finished cost with outfit.....	\$4,348.90.....		Not known.....	\$271.60.....	
17. Bucket.....	No bucket.....	None.....	None.....	None.....	None.....
(6) Type.....	No bucket.....	None.....	None.....	None.....	None.....
(6) Capacity.....	No bucket.....	30 feet 7 inches.....	No galleys frame.....	25 feet.....	Shear legs, 30 feet above deck.....
18. Height of galleys frame.....	No bucket.....	30 feet 7 inches.....	No galleys frame.....	25 feet.....	Shear legs, 30 feet above deck.....
19. Length of boom and material.....	29 feet, wood.....	35 feet 8 inches; wood.....	No boom.....	None.....	90 tons (shear legs).....
20. Capacity.....	15 tons.....	10 tons.....	No hoisting engine.....	20 tons.....	90 tons (shear legs).....
21. Capacity of machine per hour while bucket dredging.....	No dredging outfit.....	None.....	No hoisting engine.....	None.....	Double; 7-inch diameter, 12-inch stroke.....
22. Dimensions of main hoisting-engine cylinders.....	2 cast-iron cylinders, 6 by 6 inches.....	.....do.....	No hoisting engine.....	6 by 12 inches.....	Double; 7-inch diameter, 12-inch stroke.....
23. Dimensions of swinging engine.....	No swinging engine.....	.....do.....	None.....	None.....	None.....
24. Dimensions of propelling-engine cylinders.....	Nonpropelling.....	9 inches by 3-foot stroke.....	11 1/2 inches diameter, 31-foot stroke.....	.....do.....	15-inch diameter, 4-foot stroke.....
25. Side or stern wheel.....	None.....	Stern.....	Stern.....	.....do.....	Stern.....
26. Diameter of wheel.....	No wheel.....	11 feet.....	11 feet 6 inches.....	.....do.....	16 feet.....
27. Length and width of buckets.....	No buckets.....	17 feet 3 inches by 14 inches.....	14 feet long 12 inches wide.....	.....do.....	19 feet long, 16 inches wide.....
28. Least diameter of shaft.....	No shaft.....	4 1/2 inches.....	4 1/2 inches.....	.....do.....	7 1/2 inches.....
29. Revolutions per minute.....	Nonpropelling.....	26.....	26.....	.....do.....	26.....
30. Speed in miles per hour.....	.....do.....	6.....	12 miles.....	.....do.....	8 miles (average).....

[illegible]

TABLE VIII.—*Report of operations of snag boats for the calendar year ending Dec. 31, 1916—Continued.*

Name.....	Escatawpa.	Flint.	Florence, Thos. B.	Genora.	Houell, C. W.
	<p><i>Remarks.</i></p> <p>1 Operated on Pascagoula River, Miss., above mouth of Dog River. The snags and obstructions removed are exclusive of bushes.</p>	<p><i>Remarks.</i></p> <p>This boat was operated during the year from November until Dec. 31, 1916, in the Apalachicola River, Fla., and the upper Chipola River, Fla., removing 815 obstructions from the channel.</p> <p>From the first of the year until November she was under repairs at Columbus, Ga. These repairs consisted in transferring machinery and outfit to the new hull and installing new boiler.</p>	<p><i>Remarks.</i></p> <p>Two thousand tons rap, 200 tons coal and 30 tons of cement towed from Wichey, Miss., to Big Sunflower River Lock and Dam, Little Call to Land, Miss. (16 miles), Jan. 1 to Feb. 9.</p> <p>Towed plant from Big Sunflower River Lock and Dam to Vicksburg, Miss., Feb. 10 to 21. Towed plant from Vicksburg, Miss., to Lock and Dam No. 4, Perdue Shoals, Ouachita River, Ark., June 1 to 20.</p> <p>Towed plant from Lock and Dam No. 7 to Lock and Dam No. 6, Roland Rait, Ark., Oct. 18 to 21.</p> <p>No obstructions removed or material dredged.</p>	<p><i>Remarks.</i></p> <p>This item of plant worked during the year on the Holmes River, Fla., near Vernon, Fla., and on the Choctawhatchee River, Fla., between miles 34 and 67; was under extraordinary repairs at Caryville, Fla., for 1 month.</p> <p>Removed 3,717 obstructions, including overhanging trees and cords of brush cut from bank.</p>	<p><i>Remarks.</i></p> <p>Employed in Red River, La. and Ark., below Fulton; 2,450 snags pulled; 1,200 stumps pulled; 180 shore snags cut; 1,722 leaning trees cut; 14 side jams removed; 10 posts and 182 head of live stock saved from overflow. Performed miscellaneous towing barges, quar-ter-boats, etc.</p>

Name.....	Hampshire, Ben.	Iroquois.	Johnson, A. B.	Kentucky.	Kissimmee.
1. District.....	Vicksburg, Miss.....	First Cincinnati, Ohio.....	Little Rock, Ark.....	Second Cincinnati, Ohio.....	Jacksonville, Fla.....
2. Length over all.....	155 feet 6 inches.....	148 feet 2 inches.....	84 feet.....	148 feet.....	60 feet.....
3. Length of hull.....	137 feet.....	130 feet 6 inches.....	84 feet.....	127 feet.....	60 feet.....
4. Length on water line.....	130 feet.....	123 feet 6 inches.....	81 feet.....	123 feet.....	58 feet 9 inches.....
5. Beam over all.....	32 feet.....	28 feet 1/4 inches.....	23 feet 6 inches.....	34 feet.....	18 feet.....
6. Beam at loadwater line.....	32 feet.....	28 feet.....	22 feet.....	30 feet.....	18 feet.....
7. Depth.....	5 feet.....	4 feet.....	3 feet.....	5 feet 6 inches.....	4 feet.....
8. Draft:					
(a) Forward.....	2 feet 6 inches.....	1 foot 11 inches.....	1 foot 5 inches.....	3 feet 6 inches.....	1 foot 8 inches.....
(b) Aft.....	3 feet 4 inches.....	1 foot 11 inches.....	1 foot 6 inches.....	4 feet 3 inches.....	1 foot 8 inches.....
9. Displacement.....	28; 60 long tons.....	176.8 long tons.....	60 tons.....	370 tons.....	46 tons.....
10. Builder.....	Ed J. Howard.....	Dubuque Boat & Boiler Works.....	U. S. Engineers.....	Ed J. Howard.....	Built by hired labor.....
11. Where built.....	Jeffersonville, Ind.....	Dubuque, Iowa.....	Madison, Ark.....	Jeffersonville, Ind.....	Kissimmee, Fla.....
12. When built.....	Apr. 2, 1906, to May 30, 1908.....	1913.....	1913.....	1899.....	1908; rebuilt and converted into snag boat, 1911.....
13. Time to build.....	2 years and 2 months (about).....	9 months.....	31 months.....	7 months.....	2 months.....
14. Material of hull.....	Iron and steel.....	Steel.....	Wood, cross-roted.....	Wood.....	Wood.....
15. Contract cost.....	\$42,483.....	\$30,415.....	(1).....	\$27,078.50.....	\$4,000, estimated.....
16. Finished cost with outfit.....	\$46,113.40.....	\$34,428.35.....	\$4,500.....	Unknown.....	Included in above.....
17. Bucket:					
(a) Type.....	Orange-peel.....		None.....	No dredging outfit.....	None.....
(b) Capacity.....	1 cubic yard.....		do.....	do.....	43 feet.....
18. Height of gallows frame.....	26 feet 6 inches.....		26 feet.....	28 feet.....	40 feet, yellow pine.....
19. Length of boom and material.....	60 feet long; steel lattice channel.....		None.....	No boom; steel A-frame.....	6 tons, estimated.....
20. Capacity.....	5 tons.....		20 tons.....	26 tons.....	
21. Capacity of machine per hour while bucket dredging.....	60 cubic yards.....		No dredging equipment.....	No bucket.....	
22. Dimensions of main holding-engine cylinders.....	8 1/2 inches diameter, 10-inch stroke.....		Four 4 by 6 inches.....	8 inches diameter, 10-inch stroke.....	Two 8 by 10 inches.....
23. Dimensions of swing-ing engine.....	8 by 10 inches.....		None.....	No swinging engine.....	None.....
24. Dimensions of propelling-engine cylinders.....	12-inches diameter, 6-foot stroke.....	2 noncondensing California cut-off.....	do.....	15 inches diameter, 5-foot stroke.....	Do.....
25. Side or stern wheel.....	Stern.....	Stern.....	do.....	Stern.....	Do.....
26. Diameter of wheel.....	164 feet.....	14 feet 2 inches.....	do.....	15 feet 8 inches.....	
27. Length and width of buckets.....	18 feet long, 13 inches wide.....	18 feet long, 24 inches wide.....	do.....	20 feet 8 inches; width, 27 inches.....	
28. Least diameter of shaft.....	7 inches.....	Hexagonal, 6 inches least diameter.....	do.....	8-inch hexagon.....	
29. Revolutions per minute.....	20.....	20 to 30.....	do.....	24.....	
30. Speed in miles per hour.....	8 (average).....	8 to 9 per hour up and down stream.....	do.....	9.....	

TABLE VIII.—Report of operations of snag boats for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Humphreys, Ben.	Iroquois.	Johnson, A. B.	Kentucky.	Kistimnee.
31. Boilers:					
(a) Number.....	2.	1.	1.	3.	1.
(b) Type.....	Mississippi River cylindrical return flue.	Lyons fire and water tube.	Vertical.	Cylinder return flue; 2 flues each.	Locomotive.
(c) Diameter and diameter of flues in one boiler.	Two 10-inch and four 6-inch.	11 water tubes, 4-inch; 40 fire tubes, 31-inch.	Eighty-four 2-inch tubes.	2, diameter 12.5 inches.	No data.
(d) Diameter and length.	22 feet long, 40 inches diameter.	48 inches diameter, 16 feet long.	42 inches by 7 feet.	20 feet by 38 inches.	Do.
(e) Heating surface (total).	737 square feet.	740 square feet.	200 square feet.	762 square feet.	Do.
(f) Grate surface.	47 square feet.	20 square feet.	7.9 square feet.	54 square feet.	Do.
(g) Working steam pressure.	181 pounds (limit).	200 pounds.	100 pounds.	190 pounds.	80 pounds.
OPERATING COST.					
32. Pay roll.....	\$8,407.39	\$8,754.62	\$2,575.32	\$7,218.18	1 \$444.98
33. Fuel.....	2,958.70	1,191.10	20.23	2,945.00	30.00
34. Oil:			(*)	10.95	.....
(a) Kerosene.....	14.31	18.13	8.33	66.04	.....
(b) Lubricating.....	25.72	48.08			.....
35. Supplies:					.....
(a) Subsistence.....	2,650.06	2,592.33	770.95		.....
(b) Machinery.....	409.04	76.54	20.39	103.86	65.00
(c) Miscellaneous.....	563.89	218.85	9.81	94.91	178.94
36. Renewals or additions to outfit.	166.89	294.52	509.76	371.58	.....
37. Ordinary repairs.....	478.25	417.24	213.86	408.61	.....
38. Laundry, ice, and miscellaneous.	35.40	664.68	\$ 78.93	47.08	.....
39. Total field cost.....	\$15,709.67	\$14,276.59	\$4,225.53	\$11,276.41	\$717.32
40. Extraordinary repairs.....		388.83	12.50	2,935.57	.....
41. Office expenses.....	314.19	18.43	211.28	320.00	.....
42. Gross cost.....	15,023.86	14,683.85	4,449.36	14,512.98	.....
43. Work done during the year and where operated.	See Remarks.....	See Remarks.....	(*)	(*)	(*)
44. Gross cost per obstruction.	\$2.49	\$15.893	Indeterminate.	\$6.77	\$0.9315 cents.

46. Gross cost per cubic yard of dredged material.	10.5 cents	Remarks.	No dredging equipment.....	No dredging outfit.....	None.
46. Number of days under steam.	138.	Employed in Yazoo and Big Sunflower Rivers, Miss.—848 snags pulled, 75 stumps pulled, 601 logs removed from channel, 91 jams removed, 398 leaning trees cut, 38 shore snags cut, 2 wrecks destroyed, 24,375 cubic yards of material dredged from channel. Performed miscellaneous towing barges, quarter boats, etc.	253.	259.	24.
		(43) In figuring the year's cost per obstruction, the operating costs of the Troquois, Mingo, Flat, Os. 10 and 11 have been combined, as these boats work jointly. The following is a list of the work done during the year and where operated: Removed 1,340 snags, 12 coal barges, 5 coal boats, 2 steam boat hulls, 4 fuel flats, 4 sand flats, 3 model barges, 2 wharf boats, 1 derrick boat, 1 sand digger, 1 gasoline boat, 2 timber cribs, 1 piece cuffer-dam, 440 cords of wood from 11 different locations, and 166.6 cubic yards of earth. Operated between the Pennsylvania State line and Vevay, Ind.	Remarks.	Remarks.	Remarks.
			1 Rebuilding cost plus value of machinery and upper works from old hull equals \$4,000. 2 Karosene and ice included in subsistence; lumber dry included in pay roll. 3 500 snags, 305 saw logs, and 49 stumps removed from channel; 1 drift raft broken, 282 trees cut, and 42 griddled in St. Francis and 1, An-guille Rivers and Blackfish Bayou, Ark.	1 Returned from the first Cincinnati (Ohio) district Jan. 20, 1918; operated on Kentucky River; assisted in repair work at the various locks; removed obstructions from land slides; miscellaneous towing.	1 Including hire of watchman, 11 months at \$10 per month. 2 Removing snags, overhanging trees, and obstructions from the Caloosahatchee River above Fort Myers. The plant was laid up Jan. 27, in Jacks Branch, near Fort Lemaud, in charge of a watchman.

TABLE VIII.—Report of operations of snag boats for the calendar year ending Dec. 31, 1916—Continued.

Name.	McComb, J. N.	Mammoth Cave.	Mandan.	Mathloma.	McCalla, R. C.
1. District.	St. Louis, Mo.	Louisville, Ky.	Kansas City, Mo.	Second Portland, Ore.	Mobile, Ala.
2. Length over all.	177 feet 6 inches.	141 feet.	156 feet.	160 feet.	119 feet 6 inches.
3. Length of hull.	174 feet 11 inches.	123 feet 6 inches.	140 feet.	140 feet.	100 feet.
4. Length on water line.	174 feet 11 inches.	121 feet 5 inches.	136 feet.	135 feet.	90 feet 9 inches.
5. Beam over all.	62 feet.	32 feet 8 inches.	21 feet.	31 feet 6 inches.	28 feet 3 inches.
6. Beam at load water line.	61 feet 10 inches.	30 feet.	21 feet.	34 feet.	28 feet 3 inches.
7. Depth.	8 feet.	5 feet.	4 feet 7 inches.	5 feet 6 inches.	5 feet.
8. Draft:					
(a) Forward.	4 feet 9 inches.	2 feet 11 inches.	2 feet 21 inches.	1 foot 8 inches.	1 foot 3 inches.
(b) Aft.	4 feet 9 inches.	3 feet 7 inches.	2 feet 44 inches.	1 foot 11 inches.	2 feet 7 inches.
9. Displacement.	1,160 tons.	284 long tons.	150 tons.	177 tons.	133 tons.
10. Builder.	M. G. Thom.	Ed. J. Howard.	Carondelet Boiler & Sheet Iron Works.	Joseph Supple.	Ed. J. Howard.
11. Where built.	Cincinnati, Ohio.	Jeffersonville, Ind.	St. Louis, Mo.	Portland, Ore.	Jeffersonville, Ind.
12. When built.	1873-74.	1908.	1891.	First built 1906; hull rebuilt in 1908 and again in 1915.	1909.
13. Time to build.	22 months.	11 months.	About 5 months.	2 months.	Apr. 20, 1908-Feb. 5, 1909.
14. Material of hull.	Steel.	Steel.	Steel.	Wood.	Wood.
15. Contract cost.	\$240,000.	\$30,830 (hull).	\$21,500.	\$19,360 (first cost).	\$19,000.
16. Finished cost with outfit.		\$36,845.19 (without machinery). ¹	No record.	\$20,090.	No record.
17. Bucket:					
(a) Type.	None.	No dredging outfit.	No dredging outfit.	Williams's grab.	No buckets.
(b) Capacity.	19 feet 6 inches.	Shear legs 29 feet.	Shear legs 31 feet long.	14 cubic yards.	34 feet.
18. Height of gallow's frame.		No boom.	None.	50 feet, wood.	40 feet, wood.
19. Length of boom and material.		60 tons.	50 tons.	15 tons.	15 tons.
20. Capacity.		Not used for dredging.		141 cubic yards.	No dredging outfit.
21. Capacity of machine per hour while bucket dredging.					
22. Dimensions of main hoisting-engine cylinders.	7 by 16 inches, double oscillating.	2 capstans, 4 cylinders 6 by 12 inches.	Four 8 by 10 inches (3 capstans).	10 by 12 inches.	6½ inches diameter: 10-inch stroke.
23. Dimensions of swinging engine.	22-inch by 8-foot stroke.	None.	Two 6 by 8 inches (4-foot stroke).	No separate engine.	No swinging engine.
24. Dimensions of propelling-engine cylinders.		14 inches; 4 by 4½ feet.	High pressure, 38.48 square inches; low pressure, 147.61 square inches.	16 by 60 inches.	10 inches by 5 feet.
25. Side or stern wheel.	Slide.	Stern wheel.	Stern.	Stern.	Stern wheel.
26. Diameter of wheel.	21 feet.	13 feet 9 inches.	13 feet 8½ inches.	16 feet.	13 feet.
27. Length and width of wheel.	12 feet by 22 inches wide.	19 feet by 20 inches.	15 feet 3 inches; 18 inches.	16 feet by 18 inches.	Length 16 feet, width 16 inches.
28. Least diameter of shaft.	8½ inches.	17 inches.	5½ inches.	7 inches.	9 inches.
29. Revolutions per minute.	18.	17.	20.	24.	24.
30. Speed in miles per hour.	6½.	8.	6 to 7.	10.	9.

31. Boilers:	5. Mississippi River	3. Cylinder, return flue.	2. Western river	1. Locomotive	2. Western river steamboat type.
(a) Number.....	Two, 9 inches; two, 11 inches.	Two, 11½ inches.	SLx, 6 inches.	187 of 24 inches diameter.	SLx, diameter 6 inches.
(b) Type.....					
(c) Number and diameter of flues in one boiler.	42 inches by 28 feet.	36 inches by 20 feet.	36 inches by 20 feet.	5 by 21½ feet.	36 inches by 24 feet.
(d) Diameter and length.	2,550 square feet.	708.27 square feet.	560 square feet.	1,805 square feet.	753.3 square feet.
(e) Heating surface (total).	96 square feet.	65 square feet.	34 square feet.	28 square feet.	40 square feet.
(f) Grate surface (total).	160 pounds.	187 pounds.	200 pounds.	135 pounds.	202 pounds.
(g) Working steam pressure.					
OPERATING COST.					
32. Pay roll.....	\$25,891.72	\$6,719.44	\$8,691.34	\$8,540.17	\$7,870.23
33. Fuel.....	6,890.78	1,766.09	2,579.17	1,506.50	939.63
34. Oil:					
(a) Kerosene.....	6.00	19.80	19.58	41.93	10.10
(b) Lubricating.....	100.23	17.32	47.74	54.60	41.70
35. Supplies:					
(a) Subsistence.....	6,762.53	1,759.33	2,238.54	1,706.04	1,401.63
(b) Machinery.....	114.65	26.86	70.45	143.03	124.58
(c) Miscellaneous.....	1,361.43	178.40	15.69	1,191.96	701.69
36. Renewals or additions to outfit.	2,052.87	91.03	607.63	188.86	86.00
37. Ordinary repairs.....	362.52	1,059.78	571.36	683.82	79.43
38. Laundry, ice, and miscellaneous.	50.20	273.56	192.50	300.56	80.90
39. Total field cost.	\$45,818.80	\$11,912.21	\$15,134.00	\$14,377.47	\$10,907.86
40. Extraordinary repairs.				403.99	1,902.38
41. Office expenses.....	2,718.69		454.02	921.66	75.00
42. Gross cost.....	48,537.58	11,912.21	15,588.02	15,663.12	12,885.24
43. Work done during the year and where operated.	See Remarks.	See Remarks.	1,270 snags pulled and 238 miscellaneous obstructions; 5,093 trees felled; total, 7,111.	(1)	13,167 snags and obstructions removed.
44. Gross cost per obstruction.	Approximately \$15 each.	Not known; snagging operations not continuous.	\$2.34.	\$2.14.	\$0.9458+
45. Gross cost per cubic yard of dredged material.		No dredging done.		13½ cents.	\$0.45.
46. Number of days under steam.		313.	228.	285.	172.

TABLE VIII.—*Report of operations of snag boats for the calendar year ending Dec. 31, 1916—Continued.*

Name.....	Macomb, J. N.	Marmoth Cove.	Mandan.	Mathoma.	McCalla, R. C.
	<p><i>Remarks.</i></p> <p>Mississippi River from mouth of Missouri River to Head of Passes and Atchafalaya, and Old Rivers. Drift piles removed, 17; wrecks removed, 7; snags destroyed, 1,951.</p>	<p><i>Remarks.</i></p> <p>Operated on Green and Barren Rivers: snags, trees, etc., removed, 450; boats towed, 437 miles run, 5,412; assisted in repair work at the several locks; acted as snagboat 39 days, as tow-boat 114 days, as dredge tender 41 days; assisted in lock and dam repairs 33 days; miscellaneous work, 15 days. Operated with single crew only. Transferred 1 machinery transferred from old boat.</p>	<p><i>Remarks.</i></p> <p>Missouri River (Fort Pierre, S. Dak., to Fort Benton, Mont.). At end of season boat went into winter quarters at Sioux Ice Harbor, S. Dak. Cost per day, \$68.32.</p>	<p><i>Remarks.</i></p> <p>Employed 79 days supplying gravel for concrete, towing, and handling material at Oregon City Locks, Oreg. 1 Dredged 40,847 cubic yards of material and removed 3,154 obstructions in the upper Willamette and Yamhill Rivers, Oreg.</p>	<p><i>Remarks.</i></p> <p>1740 cubic yards of flood deposit dredged from locks and approaches.</p>

Name.....	McPherson, James B.	Missouri.	Oconee.	Orisk.	Perl.
1. District.....	Kansas City, Mo.	Kansas City, Mo.	Savannah, Ga.	St. Paul, Minn.	Mobile, Ala.
2. Length over all.....	194 feet.	187 feet.	126 feet.	107 feet.	90 feet 6 inches.
3. Length of hull.....	170 feet.	187 feet.	110 feet.	90 feet.	52 feet 6 inches.
4. Length on water line.....	100 feet.	184 feet.	110 feet.	87 feet.	74 feet 3 inches.
5. Beam over all.....	30 feet.	32 feet, or 40 feet 6 inches, with wheel house.	28 feet.	27 feet 4 inches.	36 feet 6 inches.
6. Beam at load water line.....	30 feet.	32 feet.	28 feet.	18 feet.	26 feet.
7. Depth.....	5 feet 7 inches.	7 feet.	4 feet 4 inches.	6 feet.	5 feet.
8. Draft.....					
(a) Forward.....	2 feet 6 inches.	3 feet.	1 foot 6 inches.	3 feet 4 inches.	2 feet 5 inches.
(b) Aft.....	2 feet 6 inches.	3 feet 6 inches.	1 foot 6 inches.	3 feet 6 inches.	2 feet 7 inches.
9. Displacement.....	310 tons.	510 tons.	136 tons.	80 long tons.	128 tons.
10. Builder.....	Iowa Iron Works.	James Reese & Sons.	Unknown.	Mississippi Transportation Co.	
11. Where built.....	Dubuque, Iowa.	Pittsburgh, Pa.	Macon, Ga.	Altam, Minn.	Mobile, Ala.
12. When built.....	1891.	1898.	1897; rebuilt by U. S. Engineering Department, 1906.	1908.	1903.
13. Time to build.....	No record.	3 years.	Unknown.	3 months.	About 5 months.
14. Material of hull.....	Steel.	Steel.	Wood.	Wood.	Wood.
15. Contract cost.....	\$15,500.	\$115,000.	Unknown.	\$3,500.	\$1,250.
16. Finished cost with outfit.....	No record.	No record.	\$10,000.	\$11,412.80.	See Remarks.
17. Bucket.....	No dredging outfit.	None.	3-arm orange peel.	3-leaved orange peel.	No bucket.
(a) Type.....			4 cubic yard.	4 cubic yard.	D.O.
(b) Capacity.....			28 feet.	None.	Derrick mast, 30 feet.
18. Height of galleys frame.....	Sheer legs: 34 feet long.	Sheer legs: 21 feet 4 inches.	35 feet, wood.	34 feet, wood.	45 feet; wood.
19. Length of boom and material.....	None.	None.	5 tons.	5 tons.	25 tons.
20. Capacity of machine.....	100 tons.		25 cubic yards.	50 cubic yards.	No dredging outfit.
21. Capacity of machine per hour while bucketting.....			4 cylinders, 64 by 8 inch stroke.	2, each 8 by 10 inches.	2 capstans, 4 cylinders 6 by 6 inches.
22. Dimensions of main hoisting-engine cylinders.....	Four, 10 by 6 inches; two, 6 by 10 inches; 3 capstans.	9 inches by 12 inches.	Same engine as for hoisting.	2, each 43 by 6 inches.	No swinging engines.
23. Dimensions of sawing engine.....			Two 10 by 54 inch stroke.	9 by 48 inches.	84 inches by 3-foot stroke.
24. Dimensions of propelling-engine cylinders.....	High pressure, 16 by 72 inches; low pressure, 32 by 72 inches.	High pressure, 20 inches by 4 feet; low pressure, 32 inches by 4 feet.	Stern.	Stern.	Stern wheel.
25. Side or stern wheel.....	19 feet.	Side.	13 feet.	15 feet 8 inches.	10 feet 10 inches.
26. Diameter of wheel.....	18 feet 4 inches; 22 inches.	17 feet 8 inches.	12 feet by 12 inches.	10 feet 3 inches by 2 feet 2 inches.	11 feet long by 12 inches wide.
27. Length and width of buckets.....	8 inches.	11 inches.	6 inches.	5 inches.	4 inches.
28. Least diameter of shaft.....	16.	20.	30.	15.	16.
29. Revolutions per minute.....	5 upstream; 10 to 12 downstream.	5 upstream; 12 downstream.	5 miles upstream; 9 miles downstream.		74 miles.
30. Speed in miles per hour.....					

TABLE VIII.—Report of operations of snag boats for the calendar year ending Dec. 31, 1916—Continued.

Name.....	McPherson, James B.	Missouri.	Oconee.	Oriole.	Pearl.
31. Boilers: (a) Number..... (b) Type..... (c) Number and diameter of flues in one boiler, length, and diameter..... (d) Diameter and length..... (e) Heating surface (total). (f) Grate surface (total). (g) Working steam pressure.	1. Iowa..... 112: 3½ inches..... 6 feet; 12 feet..... 1,371 square feet..... 36 square feet..... 150 pounds.....	5. Brickyard; horizontal fire flue. 10; 6 inches..... 44 inches; 20 feet..... 1,812 square feet..... 90 square feet..... 150 pounds.....	1. Horizontal return tubular, set in steel casing. Forty-six 4-inch diameter tubes. 5 feet 6 inches diameter; 15 feet long. 825 square feet..... 33 square feet..... 150 pounds.....	1. Locomotive..... 38 flues, each 3 inches diameter. 42 by 102 inches..... 570 square feet..... 21 square feet..... 180 pounds.....	1. Western river steamboat type. Three 6-inch and three 8-inch flues. 40 inches by 21 feet. 497½ square feet. 27½ square feet. 175 pounds.
OPERATING COST.					
32. Pay roll.....	\$10,725.91			\$193.00	\$4,447.17
33. Fuel.....	3,293.55	\$20,831.60	\$7,353.50	28.44	346.07
34. Oil: (a) Kerosene..... (b) Lubricating.....	24.32 38.50	36.62 181.45	22.32 70.83	(1)	10.64 34.63
35. Supplies: (a) Subsistence..... (b) Machinery..... (c) Miscellaneous.....	2,846.76 167.65 778.57	5,305.60 205.16 205.16	1,997.64 90.92 374.55	40.75	1,044.43 2.50 571.27
36. Renewals or additions to outfit.		1,265.88	820.86	33.27	
37. Ordinary repairs.....	834.43	1,721.84	2.56	229.76	503.16
38. Laundry, ice, and miscellaneous.	476.63	514.09	99.50		12.39
39. Total field cost	\$19,186.32				
40. Extraordinary repairs.	2,469.40	\$36,228.13		\$525.22	\$6,973.26
41. Office expenses.....	601.84	4,413.66		1,019.62	
42. Gross cost.....		1,219.25		484.91	1,478.87
43. Work done during the year and where operated.	22,257.56	41,861.01	12,590.75	2,069.75	8,451.12
44. Gross cost per obstruction:	1,583 snags pulled and 16 miscellaneous obstructions; 642 trees felled; total, 2,251.	2,109 obstructions removed; 1,959 trees felled; total, 4,068.	See Remarks.....	Out of commission.....	12,807 snags and obstructions removed. ¹
	\$9.38.....	\$10.29.....	Not computable on account of variety of work.		\$0.676.

45. Gross cost per cubic yard of dredged material.	46. Number of days under steam.	No dredging outfit.			
221	Remarks. Missouri River (Kansas City, Mo., to Fort Pierre, S. Dak.). At end of season boat went into winter quarters for extraordinary repairs at Gasconade, Mo. (Cost per day, \$85.34.	275	Remarks. Operations between Kansas City, Mo., and mouth of Missouri River. Boat went into winter quarters at Gasconade, Mo. Cost per day, \$132.33.	198	Remarks. Altamaha River: Placed 2,511 cubic yards of rock in raising cut off dam at Jacks Suck. Oconee River: One hundred miles of river improved. Removed 24,777 snags, 151 stumps, 285 overhanging trees, and 22 logs. Also removed several abandoned wrecks at Dublin, Ga. Placed 45 cubic yards of rock and quarried 211 cubic yards of rock. Ocmulgee River: Twenty-two miles of river improved. Removed 110 snags, 20 stumps, 75 overhanging trees and 17 logs. Also used in towing plant to various parts of district. Laid up from June 30 to August 21 on account of lack of funds.
		None	Remarks. Expenses due to accidental sinking of dredge, also extraordinary repairs under authority E. D. 78021/13. None purchased.	123	Remarks. Made self-propelling at Mobile, Ala., 1908, at a cost of \$3,865.99. Operated on Pearl River, below Rockport, Miss., and Pascagoula River, Miss., above mouth of Dog River. The snags and obstructions removed are exclusive of bushes.

TABLE VIII.—Report of operations of snag boats for the calendar year ending Dec. 31, 1916—Continued.

Name	Pelée.	Pigeon.	Quapaw.	Rosedell, Joe E.	Essee, C. B.
1. District	Charleston, S. C.	New Orleans, La.	Little Rock, Ark.	Vicksburg, Miss.	Little Rock, Ark.
2. Length overall	131 feet 8 inches.	60 feet.	147 feet 6 inches.	155 feet 6 inches.	195 feet 9 inches.
3. Length of hull	114 feet.	60 feet.	125 feet.	137 feet.	171 feet 6 inches.
4. Length on water line	110 feet.	60 feet.	123 feet.	130 feet.	164 feet 6 inches.
5. Beam overall	27 feet.	30 feet 6 inches.	30 feet 6 inches.	32 feet.	37 feet.
6. Beam at lead water line	25 feet.	30 feet 6 inches.	30 feet.	32 feet.	36 feet.
7. Depth	5 feet 3 inches.	6 feet.	4 feet 4 inches.	5 feet.	5 feet 4 inches.
8. Draft:					
(a) Forward	2 feet 3 inches.	3 feet.	2 feet 5 inches.	2 feet 6 inches.	1 foot 6 inches.
(b) Aft	3 feet.	3 feet.	2 feet 10 inches.	3 feet 4 inches.	3 feet 1 inch.
9. Displacement	317 tons.	65 tons.	249 tons.	286.60 long tons.	365 tons.
10. Builder	United States Navy Yard, Charleston, S. C.	Unknown.	United States Engineers.	Ed J. Howard.	Fulton Iron Works and United States Engineers.
11. Where built.	do.	Miss Point, Miss.	Little Rock and Batesville, Ark.	Jeffersonville, Ind.	Carondelet, Mo.
12. When built	1912-13.	Unknown.	(1) Ark.	Apr. 2, 1906 to May 30, 1908.	1879.
13. Time to build	9 months.	do.	Last rebuilding 4½ months.	About 2 years and 2 months.	Not known.
14. Material of hull	Steel.	Wood.	Wood.	Iron and steel.	Iron and steel.
15. Contract cost	Built by United States.	Purchased, \$1,350.	(2) Wood.	\$42,483.	\$73,325.20.
16. Finished cost with outfit	\$29,283.45.	\$3,500.	\$18,006.35.	\$45,402.57.	About \$80,000.
17. Bucket:					
(a) Type	No dredging outfit.	Orange peel.	None.	None.	None.
(b) Capacity	do.	1 cubic yard.	do.	do.	Do.
18. Height of mow frame	16 feet.	6 feet.	30 feet.	Shear legs, 30 feet above deck.	38 feet 6 inches.
19. Length of boom and material	40 feet; wood.	Wood, 14 by 14 inches by 45 feet.	None.	None.	None.
20. Capacity	25 tons.	do.	30 tons.	75 tons (shear legs).	60 tons.
21. Capacity of machine bucket dredging	No dredging outfit.	do.	No dredging equipment.	do.	No dredging equipment.
22. Dimensions of main hoisting-engine cylinder	9 by 10 inches.	8½ by 10 inches.	Two 8 by 10 inches and two 6 by 8 inches.	8½ inches diameter, 10-inch stroke.	Two 8 by 16 inches.
23. Dimensions of swing-frame engine	5 feet 3½ inches by 5 feet 9 inches.	3 by 8½ inches.	None.	None.	None.
24. Dimensions of propeller	10 by 36 inches.	None.	12 inches by 3 feet 6 inches.	12 inches diameter, 6-foot stroke.	15 inches by 4 feet.
25. Diameter of propeller shaft	Stern wheel.	Nonpropelling.	Stern.	Stern.	Stern.
26. Diameter of wheel	13 feet.	None.	14 feet.	13½ feet.	18 feet 6 inches.
27. Length and width of buckets	14 feet 6 inches by 16 inches.	do.	17 feet 6 inches by 20 inches.	18 feet long, 22 inches wide.	18 feet 6 inches by 20 inches.
28. Least diameter of shaft	5 inches.	do.	6½ inches.	7 inches.	7½ inches.
29. Revolutions per minute	24.	do.	24.	18.	20.
30. Speed in miles per hour.	7.	do.	8.	7 miles (average).	7 (average).

31. Boilers:	1	2	3
(a) Number.....	Upright hoisting, American	Mississippi River cylindrical	do, fine Mississippi River.
(b) Type.....	Scotch, dry back, internally	return flue.	Two 10-inch and four 6-inch.
(c) Number and diameter of flues in boiler.....	70 tubes, 34 inches diameter by 12 feet 6 inches long.	Two 10-inch and four 6-inch.	Two 10-inch and four 6-inch.
(d) Diameter and length.....	7 feet 6 inches inside diameter, 16 feet 3 inches length over all.	22 feet long, 40 inches diameter.	40 inches by 22 feet.
(e) Heating surface (total).....	35 square feet.	737 square feet.	1,221 square feet.
(f) Grate surface (total).....	35 square feet.	38 square feet.	48 square feet.
(g) Working steam pressure.....	180 pounds.	175 pounds (limit).	180 pounds.
OPERATING COST.			
32. Pay roll.....	\$494.50	\$5,435.00	\$9,138.77
33. Fuel.....	121.50	878.86	1,068.10
34. Oil:			
(a) Kerosene.....	5.50	28.18	(¹) 31.10
(b) Lubricating.....	13.00	16.70	
35. Supplies:			
(a) Survivance.....	183.57	2,324.57	2,680.42
(b) Machinery.....	32.15	84.06	88.71
(c) Miscellaneous.....	14.67	1,017.69	130.42
36. Renewals or additions to outfit.....	24.82	143.36	860.88
37. Ordinary repairs.....	20	193.73	634.87
38. Laundry, ice, and miscellaneous.....	233.44	14.96	80.86
39. Total field cost.....	\$1,123.73	\$13,817.73	\$14,748.35
40. Extraordinary repairs.....	780.15	122.08	1,917.22
41. Office expenses.....	56.66	278.35	1,166.45
42. Gross cost.....	1,960.54	14,094.07	17,830.06
43. Work done during year and where operated.....	111 obstructions, Estherville-Minim Creek (anal, S. C.)	See remarks.	(¹).
44. Gross cost per obstruction.....	\$2,335.	\$3.65	Indeterminate.
45. Gross cost per cubic yard of dredged material.....	No dredging outfit.		No dredging.
46. Number of days under steam.....	18 days.	181	155.

TABLE VIII.—*Report of operations of snag boats for the calendar year ending Dec. 31, 1916—Continued.*

Name.....	Peder.	Pigeon.	Quapaw.	Ranadell, Jas. E.	Reese, C. B.
	<p><i>Remarks.</i></p> <p>This snag boat undergoing repairs from Jan. 1 to Feb. 3, 1916, and laid up from Feb. 21 to Dec. 31, 1916. The repairs to the snag boat were completed at the works of Volk & Murdoch Co., Charleston, S. C., on Feb. 3, 1916; the snagboat left Charleston on Feb. 4, and after looking for spud timbers for the U. S. dredge (heraw), did some snagging in the Estherville. Minn. creek Canal and returned to Columbia, S. C., on Feb. 21, 1916, and was laid up with a skeleton crew near Granby Landing, Conasahee River, S. C., and on June 13, 1916, transferred to Georgetown, S. C.</p>	<p><i>Remarks.</i></p> <p>This boat worked on Bayou Vermillion between miles 40.9 and 43.3 and removed the following from channel, viz: 16,582 cubic yards of material, 464 trees, 15 stumps, 3,170 snags and 1 old barrier. This work was begun on Mar. 20, 1916, and shut down on July 7, 1916, due to lack of funds. Boat worked on drilling piling for Schooner Bayou lock house. Launch hire and operation.</p>	<p><i>Remarks.</i></p> <p>Upper works, 1894; machinery, 1894; hull, 1915; boilers, 1915. Finished worth after rebuilding including value of old machinery and upper works, \$13,653.02. Kerosene and ice included in subsistence; laundry in pay roll. 946 snags, 116 saw logs and 159 stumps removed from channel; 2 drift rafts broken, 578 trees cut and 10 others girdled in current, Black and White Rivers, Ark. Also worked 12 days as dredge tender to dredge No. 68 in Black River, 21 days as dredge tender, to dredges in Arkansas River, and 5 days on flood relief work in White River.</p>	<p><i>Remarks.</i></p> <p>Employed in Ouachita and Black Rivers, Ark. and La. 2,498 snags pulled; 1,153 stumps pulled; 76 shore snags cut; 156 leaning trees cut; 2 vases removed; 50 people and 101 head live stock saved from overflow. Performed miscellaneous towing, barges, quartermen, boats, etc.</p>	<p><i>Remarks.</i></p> <p>Kerosene and ice included in subsistence; laundry in pay roll. 617 snags and 8 stumps removed from channels; 1 drift raft broken, and 7,772 trees cut in Arkansas and White Rivers.</p>

Name.....	Riverside.	Roanoke.	Seizer.	Swan.	Swissmish.
1. District.....	Little Rock, Ark.....	Norfolk, Va.....	San Francisco, Cal. (third).....	Pittsburgh, Pa.....	Seattle, Wash.....
2. Length over all.....	84 feet.....	115 feet.....	157 feet 7 inches.....	159 feet.....	163 feet 3 inches.....
3. Length of hull.....	84 feet.....	100 feet.....	137 feet.....	138 feet 6 inches.....	138 feet 2 inches.....
4. Length on water line.....	81 feet.....	96 feet.....	135 feet.....	135 feet.....	135 feet.....
5. Beam over all.....	23 feet 6 inches.....	25 feet 2 inches.....	35 feet.....	31 feet 4 inches.....	32 feet 8 inches.....
6. Beam at load water line.....	22 feet.....	24 feet 10 inches.....	34 feet 6 inches.....	30 feet.....	32 feet.....
7. Depth.....	3 feet.....	5 feet 10 inches.....	4 feet 8 inches.....	4 feet 6 inches, molded.....	5 feet 6 inches.....
8. Draft.....					
(a) Forward.....	1 foot 3 inches.....	3 feet 3 inches.....	2 feet 4 inches.....	Mean draft with full load, 3 feet 24 inches.....	2 feet 7 inches.....
(b) Aft.....	1 foot 4 inches.....	4 feet.....	2 feet 8 inches.....	2 feet.....	2 feet 5 inches.....
9. Displacement.....	57 tons.....	232 long tons.....	240 tons.....	264 tons.....	275 tons.....
10. Builder.....	U. S. engineers.....	Petersburg Iron Works; altered and lengthened by Chas. J. Colonna.....	Stephen Henry Davis.....	James Rees & Sons Co.....	Hall Bros. Marine Railway & Shipbuilding Co.....
11. Where built.....	Poplar Bluff, Mo.....	Petersburg, Va.....	Stockton, Cal.....	Pittsburgh, Pa.....	Winslow, Wash.....
12. When built.....	1913.....	Built 1895; altered 1901.....	1881.....	1903.....	1914-15.....
13. Time to build.....	34 months.....	Built in 9 months; altered in 3 months.....	7 months.....	About 1 year.....	74 months.....
14. Material of hull.....	Wood, crocoted.....	Georgia pine.....	Wood.....	Steel.....	Wood.....
15. Contract cost.....	(?).....	To build, \$15,321.02; to alter, \$5,240.....	\$23,774.....	\$51,800.....	\$48,225.....
16. Finished cost with outfit.....	\$4,500.....	\$21,602.30.....	\$35,000.....	\$31,007.....	\$49,812.....
17. Bucket.....	None.....	Orange peel.....	None.....	None.....	Clamshell.....
(a) Type.....	do.....	1 cubic yard.....	do.....	do.....	14 cubic yards.....
(b) Capacity.....	28 feet 2 inches.....	"A" frame, 23 feet high.....	do.....	do.....	32 feet.....
18. Height of masts.....	None.....	35 feet, Georgia pine.....	50 feet, wood.....	Working hook, "A" frame, 24 feet.....	Wood, 65 feet.....
19. Length of boom and material.....	20 tons.....	16 tons.....	50 tons.....	60 tons.....	
20. Capacity.....	No dragging equipment.....	25 cubic yards.....	Not equipped for dragging.....	Does not drag.....	
21. Capacity of machine per hour while bucket digging.....	Six 4 by 6 inches.....	12 inches diameter, 21-inch stroke.....	8 by 12 inches.....	(?).....	10 by 12 inches.....
22. Dimensions of main hoisting-engine cylinders.....	None.....	None.....	None.....	None.....	7 by 8 inches.....
23. Dimensions of swing-ing engine.....	do.....	114 inches diameter, 40-inch stroke.....	14 by 60 inches.....	15 inches diameter by 6-foot stroke.....	14 by 72 inches.....
24. Dimensions of propelling-engine cylinders.....	do.....	St m wheel.....	Stern wheel.....	Stern wheel.....	Stern wheel.....
25. St m wheel.....	do.....	12 feet.....	174 feet.....	Over buckets 18 feet.....	16 feet.....
26. Diameter of wheel.....		15 feet 5 inches long, 9 inches wide.....	21 feet by 16 inches.....	(?).....	20 feet by 18 inches.....
27. Length and width of buckets.....		74 inches.....	7 inches.....	94-inch hexagon, at bearings 84 inches.....	8 inches.....
28. Least diameter of shaft.....					

TABLE VIII.—Report of operations of snag boats for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Riverside.	Rossmore.	Seizer.	Swan.	Serhornish.
29. Revolutions per minute.....		18.....	17½.....	18.....	10.....
30. Speed in miles per hour.....		5.....	8.....	10.....	10.....
31. Boilers:					
(a) Number.....	1.....	1.....	1.....	4.....	2.....
(b) Type.....	Vertical.....	Scotch marine.....	Locomotive fire box.....	Vertical, 3 r turn-fue.....	1 locomotive and 1 vertical.
(c) Number and diameter of flues in on boiler.....	Sixty-one 2-inch tubes.....	106, each 3 inches diameter.....	136, 24 inches.....	Vertical 44, 3-inch tubes; return flue 5, 4-inch tubes.....	136, 24 inches diameter in locomotive boiler; r 95, 2 inches diameter in vertical boiler; r 74 inches; vertical, 142 inches by 6 feet.
(d) Diameter and length.....	3 feet by 7 feet.....	8 feet diameter, 14 feet long.....	5 by 21½ feet.....	Vertical, 42 inches diameter, 6 feet 4 inches high; return flue, 40 inches diameter, 22 feet 2 inches long.....	Locomotive, 65 inches by 22 inches by 6 feet.
(e) Heating surface (total).....	140 square feet.....	1,100 square feet.....	1,333 square feet.....	Vertical, 200 square feet; return flue, 1,271 square feet.....	Locomotive, 1,620 square feet; vertical, 190 square feet.
(f) Grate surface (total).....	5.24 square feet.....	45 square feet.....	20 square feet.....	Vertical, 6.3 square feet; r turn flue, 33 square feet.....	Locomotive, 33.8 square feet; vertical, 7.1 square feet.
(g) Working steam pressure.....	100 pounds.....	100 pounds per square inch.....	140 pounds.....	Vertical, 120 pounds; r turn flue, 130 pounds.....	Locomotive, 180 pounds; vertical, 140 pounds.
OPERATING COST.					
32. Pay roll.....	\$3,222.67	\$4,307.51	\$15,865.03	\$11,028.06	- 88,979.26
33. Fuel.....	64.06	304.93	2,020.43	2,021.43	2,387.12
34. Oil:					
(a) Kerosene.....	(?)	9.40	28.55	24.54	7.75
(b) Lubricating.....	19.64	13.82	49.90	36.69	64.26
35. Supplies:					
(a) Subistence.....	985.17	1,068.08	4,227.89	2,619.63	1,795.15
(b) Machinery.....	26.96	228.00	86.60	151.44	191.65
(c) Miscellaneous.....	1.25	102.40	3,072.07	102.62	376.84
36. Renewals or additions to outfit.....	652.20	56.06	2,401.95	633.84	372.20
37. Crinary repairs.....	46.87	19.45	119.12	659.42	396.45
38. Laundry, ice, and miscellaneous.....	38.50	169.10	172.75	487.14	86.33
39. Total fixed cost.....	\$5,047.32	\$6,291.74	\$28,054.66	\$17,764.81	\$14,655.01
40. Extraordinary repairs.....	21.40	45.00	64.87	12,610.33	.....
41. Office expenses.....	666.15	180.00	137.41	.....	1,118.65
42. Gross cost.....	(?)	6,516.74	(?)	30,435.14	15,773.66
43. Work done during the year and where operated.....	5,724.96	Smagging and clearing in advance of dredging.....	29,106.94	Monongahela and Ohio Rivers.....	(1).

44. Gross cost per obstruction. 45. Gross cost per cubic yard of dredged material. 46. Number of days under steam.	Indeterminate..... No dredging equipment..... 149.....	\$0.877..... None dredged..... 366.....	\$3.28..... None dredged..... 201.....	Does not dredge..... 252.....	(1). (1). 309.
	<i>Remarks.</i> 1 Rebuilding cost plus value of machinery and repair works from old hull, \$4,000. 2 Crossed and ice included in subsistence; laundry in pay roll. 3 Black and Current Rivers Ark. and Mo., 1,204 snags, 258 saw logs and 244 stumps removed from channels, 25 drift rafts broken, 703 trees cut and 26 others girdled.	<i>Remarks.</i> 1 Engaged on inland waterway, Norfolk Va. to Beaufort Inlet, N. C. Snagging, 179 days, clearing right of way in advance of dredging, 92 days; pulled logs out of woods on Virginia Cut of inland waterway for 95 days; snags and stumps removed, 6.32; number of logs and piles handled, 1,105.	<i>Remarks.</i> 1 Operated on Sacramento and San Joaquin Rivers and Georgiana Slough, Cal., 3,604 snags pulled; 2,401 trees cut from bank; 1,983 logs on sand bars and banks destroyed; 169 piles pulled; 11-dredger raised and towed from Paintsville to Sacramento, Cal. Raft of piles towed from Collins Eddy to Sacramento.	<i>Remarks.</i> 1 Does holting with 2 capstans; each capstan has 2 feet 6 inches by 10-inch cylinders. 2 Buckets, staggered, 18 feet 1 inch long over all, 24 inches wide. 3 Tending dredge No. 2 about 3 months; towing and miscellaneous repairs to locks Nos. 4 and 6, Monongahela River locks and reconstruction work on locks Nos. 4 and 6, Monongahela; inspection trips by district officer and others; pulled 28 large snags, towed 566 pieces; and out of commission on account of extraordinary repairs about 97 days.	<i>Remarks.</i> 1 Removed 2,613 snags, in Puget Sound and tributary water; dredged 22,669 yards material in Puget Sound and tributary waters; towed scows of sand and gravel, brush and stone for Lake Washington Canal; set lamp-posts, spilled way gates, made test borings, removed piling from cofferdam and general work at Lake Washington Canal locks; set buoys Snohomish River and Puget Sound.

TABLE VIII.—Report of operations of snag boats for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Tipton, David.	Tombigbee.	Trent.	Trinity.	Twining, Wm. J.
1. District.....	Rock Island, Ill.	Mobile, Ala.	Wilmington, N. C.	Dallas, Tex.	Montgomery, Ala.
2. Length over all.....	165 feet.	119 feet.	80 feet 4 inches.	121 feet 9 inches.	178 feet.
3. Length of hull.....	140 feet.	100 feet.	83 feet 4 inches.	105 feet.	158 feet.
4. Length on water line.....	152 feet.	98 feet 10 inches.	84 feet 6 inches.	98 feet 6 inches.	155 feet.
5. Beam over all.....	49 feet (over guards).	28 feet 6 inches.	24 feet 4 inches.	30 feet 8 inches.	33 feet.
6. Beam at load water line.....	34 feet.	28 feet.	21 feet 5 inches.	30 feet.	30 feet.
7. Depth.....	5 feet.	5 feet 4 inches.	2 feet 4 inches.	5 feet.	5 feet 3 inches; molded.
8. Draft:					
(a) Forward.....	2 feet 10 inches.	2 feet 5 inches.	3 feet 4 inches.	2 feet.	2 feet 9 inches.
(b) Aft.....	4 feet 5 inches.	2 feet 9 inches.	3 feet 1 inch.	3 feet.	2 feet 4 inches.
9. Displacement.....	285 tons.	151 tons.	120 tons.	100 tons.	370 long tons.
10. Builder.....	Ed J. Howard.	Ed J. Howard.	United States.	United States.	U. S. Engineer Department.
11. Where built.....	Jeffersonville, Ind.	Jeffersonville, Ind.	Newbern, N. C.	Texas City, Tex.	Mobile, Ala.
12. When built.....	1900.	1896 and 1903.	1899.	1904.	1881.
13. Time to build.....	9 months.	14 months.	6 months.	4 months.	6 months.
14. Material of hull.....	Wood.	Wood.	Wood.	Wood, long-leaf pine.	Yellow pine.
15. Contract cost.....	\$12,000.	\$19,500.	Built by United States.	Wood, long-leaf pine.	Hired labor: \$22,500.
16. Finished cost with outfit.....	\$34,083.17.	\$19,500.	\$10,000.	\$19,500.	\$35,000.
17. Bucket:					
(a) Type.....		No bucket.	Orange peel.		No dredging attachments.
(b) Capacity.....		do.	1 cubic yard.		
18. Height of gallows frame.....		27-foot mast with "A" frame.	2.12 feet above deck.	28 feet.	32 feet.
19. Length of boom and material.....		38 feet, wood.	30 feet, wood.	38 feet, cypress.	None.
20. Capacity.....		15 tons (safe load).	23 tons.	20 tons.	Do.
21. Capacity of machine per hour while bucket dredging.....		No bucket.	25 cubic yards.		Do.
22. Dimensions of main hoisting-engine cylinders.....		2 cylinders, 61 by 10 inches.	7 by 12 inches.	10 by 12 inches.	Capstans, 5 inches diameter by 8-inch stroke.
23. Dimensions of swinging engine.....		No swinging engine.	None.		None.
24. Dimensions of propeller-engine cylinders.....	18 inches diameter, 6-foot stroke.	2 cylinders, 10 inches by 6-foot stroke.	7 by 30 inches.	12 by 48 inches.	184 inches diameter by 5-foot stroke.
25. Slide or stern wheel.....	Slide wheel.	Stern wheel.	Stern wheel.	Stern wheel.	Stern wheel.
26. Diameter of wheel.....	22 feet.	13 feet.	12 feet.	14 feet.	18 feet 6 inches.
27. Length and width of buckets.....	10 feet long; width, 10, 12, 16, 20, 24 inches.	16 feet 2 inches by 15 inches.	5 feet 10 inches.	16 feet by 18 inches.	19 feet 6 inches long, 18 inches wide.
28. Least diameter of shaft.....	81 inches.	51 inches.	4 inches.	6 inches.	7 inches hexagonal.
29. Revolutions per minute.....	24.	19.	20.	20.	18 upstream.
30. Speed in miles per hour.....	6 miles up stream, 8 miles down.	74 miles.	5 miles.	7.	6 upstream.

FLOATING PLANT.

4261

31. Boilers:	3.	2.	1.	2.	2.
(a) Number.....	Externally fired, fine.....	Western river steamboat type.....	Roberts safety water tube.....	Horizontal tubular.....	Western river steamboat.
(b) Type.....	9 flues, 6 inches diameter.....	Six 4-inch flues.....	.....	28; 4 inches.....	5; 11 inches diameter.
(c) Number and diameter of flues in one boiler.....	42 inches diameter, 20 feet long;.....	3 by 24 feet.....	5 by 6 by 7 feet long.....	44 inches; 16 feet.....	47 inches diameter, 24 feet long.
(d) Diameter and heating surface.....	1,288 square feet.....	753.8 square feet.....	625 square feet.....	304 square feet.....	925 square feet.
(e) Heating surface (total).....	38 square feet.....	40 square feet.....	28 square feet.....	36 square feet.....	44 square feet.
(f) Grate surface (total).....	163 pounds.....	190 pounds.....	180 pounds.....	150 pounds.....	170 pounds.
(g) Working steam pressure.....					
OPERATING COST.					
32. Pay roll.....	\$8,584.19	\$3,270.26		\$8,503.46	\$450.50
33. Fuel.....	1,010.58	373.75		15.00	
34. Oil.....					
(a) Kerosene.....	6.00	6.84		10.67	
(b) Lubricating.....	38.00	24.06		27.44	
35. Supplies.....					
(a) Subsistence.....	1,793.38	870.93		1,344.61	125.16
(b) Machinery.....	202.14			24.06	368.35
(c) Miscellaneous.....	293.25	345.69		115.49	291.34
36. Renewals or additions to outfit.....	638.09			267.89	
37. Ordinary repairs.....	876.16	202.58		50.33	
38. Laundry, ice, and miscellaneous.....	258.76	74.90		7.80	73.11
39. Total field cost.....	\$14,973.53	\$5,129.01		\$10,376.25	\$1,338.44
40. Extraordinary repairs.....	256.22	1,784.76		1,988.68	11,257.90
41. Office expenses.....	1,777.45	868.24		928.01	244.84
42. Gross cost.....	16,310.20	7,782.03		13,311.04	12,531.27
43. Work done during the year and where operated.....	Removing obstructions: Light-house tender, upper Mississippi River.	14,398 snags and obstructions removed. ¹		8,789 obstructions, from mouth to mile 504.	Under repairs the entire year.
44. Gross cost per obstruction.....	\$4.25	\$0.540			
45. Gross cost per cubic yard of dredged material.....		No dredging outfit.			
46. Number of days under steam.....	70½ running, 91½ at bank.	132		268	

TABLE VIII.—Report of operations of snag boats for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Tipton, David.	Tombigbee.	Trent.	Trinity.	Twinning, Wm. J.
	<p>Remarks.</p> <p>At the end of the calendar year 1916 the following liabilities remain and are not included in the above:</p> <p>Pay roll, December \$425.00</p> <p>Repair materials 174.43</p> <p>Loading ice and miscellaneous 40.00</p> <p>Coal and unloading 59.32</p> <p>Charge..... 634.36</p> <p>Freight on coal..... 1,333.11</p> <p>During the past year the steamer Tipton has acted as lighthouse tender for 39 days. Total number of aids visited was 369, at a cost of \$3,418 for pay rolls, subsistence, and fuel.</p> <p>The average cost of visiting 1 aid was \$9.26.</p>	<p>Remarks.</p> <p>1 Operated on Tombigbee River between mouth and Columbus, Miss. The snags and obstructions removed are exclusive of bushes.</p>	<p>Remarks.</p> <p>Out of commission.</p>	<p>Remarks.</p> <p>Also 2,140 yards of drift was removed from mouth of river.</p>	<p>Remarks.</p> <p>No snagging work was done by this plant throughout the year, as minor repairs were being made to the hull and machinery at Montgomery, Ala., by the United States with hired labor from the beginning of the year until April 12. The snag boat was then moved to Mobile, Ala., and extraordinary repairs to hull and machinery were begun by the contractors. These repairs were practically completed by July 5, when, during a hurricane, the snag boat was torn loose from her moorings at the Government pier and blown across the river on top of the Mobile & Ohio Railroad wharf. Sufficient repairs were made to keep the boat afloat. She was removed from the wharf into the river and brought to Montgomery, Ala., on Sept. 21, where repairs necessitated by the storm have been continued until the end of the calendar year.</p>

Name.....	Tugboat.	Vienna.	Haco.	Water.	Woodruff, E. A.
1. District.....	Savannah, Ga.	Mobile, Ala.	Galveston, Tex.	Charleston, S. C.	First, Cincinnati, Ohio.
2. Length over all.....	129 feet 3 inches.	117 feet 6 inches.	135 feet 7 inches.	131 feet 3 inches.	228 feet.
3. Length of hull.....	112 feet 3 inches.	102 feet.	118 feet 5 inches.	115 feet.	220 feet.
4. Length on water line.....	112 feet 3 inches.	92 feet 8 inches.	102 feet.	110 feet.	220 feet.
5. Beam over all.....	31 feet.	26 feet.	30 feet 10 inches.	27 feet.	73 feet.
6. Beam at load water line.....	28 feet.	26 feet.	30 feet 2 inches.	26 feet.	48 feet.
7. Depth.....	5 feet 6 inches.	4 feet 6 inches.	5 feet.	5 feet 3 inches.	6 feet.
8. Draft.....	4 feet.	2 feet 1 inch.	2 feet 6 inches.	2 feet 3 inches.	3 feet 3 inches.
(a) Forward.....	4 feet 2 inches.	2 feet 7 inches.	2 feet 9 inches.	3 feet.	3 feet 6 inches.
(b) Aft.....	38 1/2 tons.	132 tons.	215 tons.	31 tons.	83 tons.
9. Displacement.....	United States	T. C. Gatti.	M. A. Sweeney Ship Yard	United States navy yard,	Machinery, A. Hartupoe &
10. Builder.....			& Foundry Co.	Charleston, S. C.	Co., Pittsburgh, Pa.
11. Where built.....	Savannah, Ga.	Pascagoula, Miss.	Jeffersonville, Ind.	do.	1874-1876.
12. When built.....	July, 1901 to November, 1902	Feb. 8 to June 11, 1911.	1910.	1912-13.	21 months.
13. Time to build.....	Wood and steel combined.	4 months.	220 days.	9 months.	Iron and steel.
14. Material of hull.....	Wood.	Wood.	Yellow pine.	Steel.	Iron and steel.
15. Contract cost.....	\$25,000.	\$11,312.37.	\$28,935.	Built by United States.	\$128,137.
16. Finished cost with outfit.....	\$30,000.	\$12,151.54.	\$29,000.	\$29,375.12.	\$133,491.81.
17. Bucket:					
(a) Type.....	Orange peel (Hammonds).	No bucket.	None.	No regular dredging outfit.	
(b) Capacity.....	21 cubic feet.	do.	40 feet.	1 and 1/2 cubic yard buckets.	
18. Height of gallows frame.....	32 feet.	Derrick mast 31 feet 9 inches.	40 feet.	40 feet, wood.	
19. Length of boom and material.....	52 feet, yellow pine	39 feet, wood.	45 feet.	40 feet, wood.	
20. Capacity.....	75 tons.	30 tons.	25 tons.	25 tons.	
21. Capacity of machine per hour while bucket dredging.....	50 cubic yards.	No dredging outfit.		About 40 cubic yards.	
22. Dimensions of main hoisting-engine cylinders.....	Two 10 1/2-inch by 12-inch stroke.	2 capstans, double cylinders, 5 by 7 inches, and 7 by 10 inches.	10 by 12 inches.	9 by 10 inches.	Duplex, 9 by 14 inches, 8 by 13 inches.
23. Dimensions of swing-ing engine.....	Same engine as for hoisting.	No swinging engines.	None.	5 feet 3/4 inches by 5 feet 9 inches.	
24. Dimensions of propelling-engine cylinders.....	Two 12-inch by 5 feet stroke.	10 inches by 4 foot stroke.	12 by 60 inches.	10 by 36 inches.	Bore, 20 inch stroke 6 feet.
25. Side or stern wheel.....	Stern.	Stern wheel.	Stern wheel.	Stern wheel.	Side wheel.
26. Diameter of wheel.....	15 feet 4 inches.	13 feet.	13 feet.	13 feet.	24 feet.
27. Length and width of buckets.....	14 feet by 11 inches.	14 feet by 14 inches.	18 feet by 18 inches.	16 inches by 11 feet 6 inches.	10 feet, 8 inches long; 12, 18, and 22 inches wide, oval.
28. Lead diameter of shaft.....	6 inches.	5 1/2 inches.	6 1/2 inches.	5 inches.	10 inches (paddle wheel).
29. Revolutions per minute.....	24.	18.	24.	21.	20.
30. Speed in miles per hour.....	4 miles upstream; 8 miles downstream.	8 miles.	8.	7.	8 to 9 miles still water.

TABLE VIII.—Report of operations of snag boats for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Tupalo.	Vienna.	Waco.	Waterce.	Woodruff, E. A.
31. Boilers: (a) Number..... (b) Type..... (c) Number and diameter of flues in one boiler. (d) Diameter and length. (e) Heating surface (total). (f) Grate surface (total). (g) Working steam pressure.	2. Columbs. Forty, 3-inch diameter. 5 feet 7 inches mean diameter, 19 feet 6 inches long. 1,254 square feet. 34.09 square feet. 150 pounds.	1. Horizontal fire tubular. Thirty-four 3-inch flues. 3 feet 8 inches by 18 feet long. 601 square feet. 224 square feet. 150 pounds.	2. Mississippi River. 32, 31 inches. 44 inches, 16 feet. 930 square feet. 32 square feet. 175 pounds.	1. Scotch, dry back, internally fired. 70 tubes, 31 inches diameter by 12 feet 6 inches long. 7 feet 6 inches inside diameter, 16 feet 3 inches length over all. 905 square feet. 35 square feet. 180 pounds.	5. Double flue. 2 flues, 14-inches diameter, each boiler. 40 inches diameter, 264 feet length. 1,910 square feet. 1073 square feet. 140, 160 pounds.
OPERATING COST.					
32. Pay roll.....	\$5,113.51	\$3,525.65	\$9,119.87	\$4,594.33	\$12,193.09
33. Fuel.....	539.18	263.51	55.78	1,292.37	1,761.53
34. Oil: (a) Kerosene..... (b) Lubricating.....	20.64	5.52 29.34	18.63 53.38	18.32 52.08	79.71 60.81
35. Supplies: (a) Substence..... (b) Machinery..... (c) Miscellaneous..... (d) Renewals or additions to outfit.	1,185.68 91.69 441.04 441.27	751.87 768.84	920.10 165.19 228.94 275.24	1,299.23 85.25 175.09 391.26	2,557.73 192.43 1,273.34 323.39
37. Ordinary repairs.....	28.26	349.73	297.71	20.00	494.47
38. Laundry, ice, and miscellaneous.	106.47	15.02	44.16	253.20	498.48
39. Total field cost.	\$7,969.74	\$5,709.48	\$12,279.00		\$19,442.00
40. Extraordinary repairs.	86.31	2,778.23	108.58	780.87	97.40
41. Office expenses.....	590.70	1,227.66	2,032.58	790.73	42.94
42. Gross cost.....	8,646.75	9,716.37	14,420.16	9,783.23	19,862.94
43. Work done during the year and where operated.	See remarks.	21,150 snags and obstructions removed. ¹	Snagging Brazos River.	(?)	See remarks. ¹
44. Gross cost per obstruction.	\$1.37	\$0.459	\$1.1145	\$2.54 each.	\$13.703.

45. Gross cost per cubic yard of dredged material.	No dredging.	No dredging outfit.		22.20 cents cubic yard.	
46. Number of days under steam.	118.	131.		148½ days. ¹	161 days.
Remarks. Savannah River below Augusta, Ga., 20 miles of river improved. Removed 2,694 snags, 257 stumps, 1,577 overhanging trees, and 80 logs. Laid up from Feb. 29, 1916, to Sept. 1, 1916, on account of lack of funds.	Remarks. ¹ Operated on Tombigbee River, between mouth and Columbus, Miss. The snags and obstructions removed are exclusive of bushes.	Remarks. 521 large snags, 495 small snags, 12,444 overhanging trees were removed. 2871 cords of wood cut. Worked along Brazos River at various points from mile 55 to mile 134. Work suspended Oct. 23, 1916, boat laid up at Lynchburg, Tex.	Remarks. ¹ No regular dredging outfit. Used as dredge only in emergency work using 3 bucket, Clamshell type and part of time 11 cubic yard orange peel (Hayward) bucket. ² 3,020 obstructions removed from bed of rivers, and 101 trees from the banks, and about 8,692 cubic yards of sand, hard clay and crusts of iron-stone were removed. The snagboat also assisted in the removal of wreck of sunken motor boat in Ashley River, S. C., from May 15 to 20, 1916. ⁴ From Jan. 22 to Apr. 21, and from June 7 to Aug. 3, 1916, snag boat laid up with a skeleton crew.	Remarks. ¹ Hull, Swift Iron Works, Newport, Ky.; Cabin, Richardson, Pittsburgh, Pa. ² Removed 1,129 snags, 7 coal barges, 2 coal boats, 1 fuel flat and 15 stone. Operated between Nine Mile Bar and Cairo, Ill.	

TABLE VIII.—Report of operations of snag boats for the calendar year ending Dec. 31, 1916.

Name.....	Wright, H. G.	Wright, Gen. H. G.	York.	No. 1.	No. 1.
1. District.....	St. Louis, Mo.	Wilmington, N. C.	Washington, D. C.	Savannah, Ga.	Nashville, Tenn.
2. Length over all.....	190 feet 6 inches.	100 feet 6 inches.	72 feet 6 inches.	54 feet.	89 feet 6 inches.
3. Length of hull.....	185 feet.	89 feet 6 inches.	71 feet 6 inches.	50 feet.	89 feet 6 inches.
4. Length on water line.....	185 feet 3 inches.	89 feet 6 inches.	69 feet.	46 feet.	85 feet.
5. Beam over all.....	62 feet.	25 feet.	22 feet 9 inches.	18 feet.	25 feet.
6. Beam at load water line.....	62 feet.	22 feet 6 inches.	22 feet.	18 feet.	25 feet.
7. Depth.....	8 feet.	5 feet 6 inches.	6 feet.	4 feet.	3 feet 4 inches.
8. Draft.....	4 feet.	2 feet 6 inches.	Light, 2 feet 6 inches; with coal and water, 2 feet 8 inches.	1 foot 4 inches.	1 foot.
(a) Forward.....	4 feet.	3 feet.	Light, 2 feet 6 inches; with coal and water, 3 feet 2 inches.	1 foot 4 inches.	1 foot 1½ inches.
(b) Aft.....	4 feet.	3 feet.	110 tons.	35 tons.	67 tons.
9. Displacement.....	1,200 tons.	United States.	H. T. Morrison & Co. contractor; rebuilt by Engineer Department, day labor.	U. S. Engineer Department.	U. S. Engineer Department.
10. Builder.....	Western Iron Boat Building Co.	Wilmington, N. C.	Petersburg, Va., rebuilt at West Point, Va.	Waycross, Ga.	Lock 7, Cumberland River.
11. Where built.....	St. Louis, Mo.	1882; rebuilt in 1910.	1891; rebuilt 1910.	1914.	1909-10.
12. When built.....	1879-80.	About 1 year to rebuild.	3 months; to rebuild 3 months.	2 months.	6 months.
13. Time to build.....	14 months.	Wood.	Georgia pine.	Wood.	Wood.
14. Material of hull.....	Steel.	About \$3,000; rebuilding \$1,085.88.	\$6,125.75; includes 1 scow, 2 flatboats; to rebuild \$5,000.	Wood.	Wood.
15. Contract cost.....	\$190,000.	\$5,380.88, including rebuilding.	Contract cost includes outfit.	\$2,380.25.	\$4,518.27.
16. Finished cost with outfit.....					
17. Bucket.....	None.	Orange peel.	None.	None.	None.
(a) Type.....					
(b) Capacity.....	19 feet 9 inches.	28 feet.	28 feet 6 inches.	16 feet.	Do.
18. Height of sawhows frame.....			40 feet, wood.		21 feet.
19. Length of boom and material.....			10 tons.		
20. Capacity.....		20 tons.			
21. Capacity of machine per hour while bucket dredging.....		50 yards.			
22. Dimensions of main hoisting-engine cylinder.....	7 by 16 inches, double oscillating.	8 by 10 inches.	8½ by 10 inches.	5½-inch by 10-inch stroke.	7 by 10 inches.
23. Dimensions of swinging engine.....		None.		None.	
24. Dimensions of propelling-engine cylinder.....	22 inches by 6 feet.	10 by 36 inches.	Propelled by hoisting engine.	None.	
25. Slide or stern wheel.....	Slide.	Stern.	Slide.	do.	
26. Diameter of wheel.....	24 feet.	10 feet.	10 feet.	Nonpropelling.	

27. Length and width of buckets.	12 feet long, 19 inches wide.	10 by 1 foot.	All are 3 feet 6 inches long; 8 are 15 inches wide, 8 are 10 inches wide.	1.	Vertical. 90 flues, 2-inch diameter.
28. Least diameter of shaft.	8 inches.	44 inches.	4 inches.	1.	36 by 34 inches.
29. Revolutions per minute	18.	20 to 25.	20.	Vertical. 80 tubes, 2-inch diameter.	259.11 square feet.
30. Speed in miles per hour.	84.	5 miles.	4 miles.	1.	7.69 square feet.
31. Boilers:					100 pounds.
(a) Number.	4.	1.	1 (renewed July, 1908; re-tubed June, 1910).	1.	
(b) Type.	Mississippi River.	Scotch.	Upright tubular.	Vertical.	
(c) Number and diameter of flues in one boiler.	Two, 12-inch; four, 7-inch.	30 tubes, 3 inches diameter.	125, 2-inch flues.	80 tubes, 2-inch diameter.	
(d) Diameter and length.	44 inches by 26 feet.	5 feet, 4 inches by 10 feet.	46 inches diameter, 88 inches high.	34 inches diameter, 84 inches long.	
(e) Heating surface (total).	2,275 square feet.	345 square feet.	346 square feet.	180 square feet.	
(f) Grate surface (total).	73 square feet.	11½ square feet.	8 square feet.	44 square feet.	
(g) Working steam pressure.	150 pounds.	80 pounds.	125 pounds.	100 pounds.	
OPERATING COST.					
32. Pay roll.	\$28,566.18	\$1,559.61	\$4,933.07	\$2,932.68	\$2,721.33
33. Fuel.	8,409.65	533.52	396.25	25.91	54.37
34. Oil:					
(a) Kerosene.	13.56	8.28	9.36	13.94	4.68
(b) Lubricating.	173.25	21.98	30.08	20.07	1.75
35. Supplies:					
(a) Subsistence.	6,924.23	208.54		933.31	547.75
(b) Machinery.			21.18	34.60	
(c) Miscellaneous.		148.11	60.36	302.56	394.34
36. Renewals or additions to outfit.	981.73	33.98	540.80	290.44	
37. Ordinary repairs.		401.45	283.18		
38. Laundry, ice, and miscellaneous.		2.58	38.63	31.31	
39. Total field cost.	\$43,068.60	\$2,918.05	\$6,252.91	\$4,604.82	\$3,724.22
40. Extraordinary repairs.	531.50	343.56	(1)		
41. Office expenses.	2,718.69		900.00	337.68	
42. Gross cost.					
43. Work done during the year and where operated.	See remarks.	See remarks.	See remarks.	See remarks.	Removed 5,593 obstructions.
44. Gross cost per obstruction.	46,318.79	3,261.61	7,152.91	4,912.50	3,724.22
45. Gross cost per cubic yard of dredged material.	Approximately \$15 each.	\$3.53	See remarks.	13.8 cents (overhanging trees included).	67 cents.
46. Number of days under steam.		\$0.22	None.	No dredging.	None.
		331.	297.	136.	116.

TABLE VIII.—Report of operations of snag boats for the calendar year ending Dec. 31, 1916—Continued.

Name.....	Wright, H. G.	Wright, Gen. H. G.	York.	No. 1. ¹	No. 1.
	<p>Remarks.</p> <p>Mississippi River, from mouth of Missouri to Head of Passes, and Aitchalaya and Old Rivers.</p> <p>Drift piles removed, 20; wrecks removed, 10; snags destroyed, 1,784; trees cut, 191.</p>	<p>Remarks.</p> <p>Fifty-three obstructions removed and 7,000 cubic yards of material dredged from Fear River above Wilmington, N. C.</p> <p>Miscellaneous work on locks and dams.</p>	<p>Remarks.</p> <p>This boat is a combined pile driver and derrick boat; self-propelled by a spur gear connection with hoisting engine. Summary of work done as follows: Jan. 1 to 10 pulled 27 old piles out of Anacostia River in vicinity of Anacostia Bridge; Jan. 11 to Feb. 2 in winter quarters undergoing repairs; Feb. 3 to Feb. 22 en route to Pamunkey R. I., Va.; Feb. 23-Mar. 16, snagging in Pamunkey River, Va.; 20 snags and 93 overhanging trees were removed from river; Mar. 16 to Mar. 27 en route to Mattaponi River, Va.; Mar. 28 to Apr. 25 removing wreck of Laurie V. Grove (see Table XXVIII); Apr. 26 to May 9 snagging in Mattaponi River; 23 snags and 3 overhanging trees were removed from river; May 10 to May 18 en route to Washington, D. C.; May 19-June 4 removed 3 wrecks in Mattawoman Creek, Md. (see Table XXVIII); June 5 to June 28 boiler retubed and machinery repaired; June 29 to Sept. 15 constructing 415 linear feet of pile platform grillage in Anacostia River; Sept. 16 to Sept. 30 and Nov. 13 to Dec. 31 making wash and core borings for piers of Key Bridge; Oct. 1 to Nov. 12 driving 109 piles in front of sea wall and placing concrete blocks in sea wall, Anacostia River, D. C.</p> <p>¹ None.</p>	<p>Remarks.</p> <p>Ocmulgee River, improving 44 miles of river; removing 1,390 snags, 172 stumps, 30,215 overhanging trees, and 55 logs; also removing old bridge pier at Macon, Ga.; Sailla River, improving 8.4 miles of river; removed 1,388 snags, 276 stumps, and 1,272 overhanging trees; St. Marys River, improving 10 miles of river; removed 349 snags, 38 stumps, and 398 overhanging trees. Laid up from May 31, 1916, to Sept. 30, 1916, on account of lack of funds.</p> <p>¹ This is a nonpropelled boat; drifts downstream when working; equipped with "A" frame on hinges, especially constructed to be lowered so as to pass under low bridges.</p>	

TABLE IX.

DERRICK BOATS.

4289

TABLE IX.—*Report of operations of derrick boats for the calendar year ending Dec. 31, 1916.*

1. Name, letter, or number.	As aforesaid.	Atlas.	Black.	"C."	Contents.
2. District.	First Portland, Ore.	Washington, D. C.	Wilmington, N. C.	Mobile, Ala.	Wilmington, N. C.
3. Where built.	Cello, Ore.	Alexandria, Va.	do	Tuscaloosa, Ala.	Newbern, N. C.
4. When built.	1913.	October, 1915 to March, 1916.	1910.	1900.	1911.
5. Builder.	United States	Dravo Contracting Co.	U. S. Engineer Department	United States.	United States.
6. Time to build.	5 months.	144 days.	About 3 months.	3 months.	3 months.
7. Material of hull.	Wood, Oregon fir.	Steel.	Wood.	Wood.	Wood.
8. Cost of hull.	\$8,200.	\$16,838.	\$1,114.41.	Hull and derrick, \$1,700.	\$2,500.
9. Cost of machinery.	\$37,815.	\$28,230.	\$166.41.	No machinery.	\$500.
10. Total cost.	\$46,015.	\$28,694, including equipment.	\$1,399.16.	\$1,700.	\$3,000.
11. Present value.	\$24,500.	\$47,000.	\$900.	\$100.	\$2,500.
12. Length.	147 feet.	72 feet.	45 feet.	46 feet.	40 feet.
13. Beam.	28 ft. 6 in.	34 ft.	20 feet.	32 feet.	20 feet.
14. De th.	5 feet.	5 feet.	4 feet.	3 feet 6 inches.	4 feet.
15. Draft forward.	2 feet.	2 feet 5 inches.	1 foot 2 inches.	0 feet 9 inches.	10 inches.
16. Draft aft.	2 feet 4 inches.	2 feet 6 inches.	1 foot 6 inches.	1 foot 6 inches.	1 foot 2 inches.
17. Displacement.	200 tons.	185.33 tons.	35 tons.	29 tons.	32 tons.
18. Mast:					
(a) Height.	22 feet.	No mast; boom swings on turntable and steel casting.	None.	39 feet 6 inches.	None.
(b) Dimensions.	12 by 12 inches.		do.	12 by 12 inches.	
19. Boom:					
(a) Length.	34 feet.	65 feet.	40 feet.	51 feet.	30 feet.
(b) Dimensions.	10 by 10 inches.	2 feet 5 inches by 2 feet 5 inches.	12 by 12 inches at bottom; 10 by 12 inches at top.	12 by 14 inches.	10 inches in diameter.
(c) How braced.	Side rods to bull wheel.	Lattice.	A frame and two back legs with rods.	Supported by 1 part of boom fall line.	A frame and back legs.
(d) Capacity in tons.	5.	10 tons.	About 7.	5.	10 tons.
20. Bull-wheel diameter.	8 feet.	14 feet.	None.	9 feet.	None.
21. Bucket:					
(a) Type.	Channel rake or drag.	Hayward clamshell and Hayward orange-peel.	do.	None.	Do.
(b) Capacity.		1½ cubic yards; 1½ cubic yards.		do.	
22. Hoisting engine:					
(a) Make.	Mundy.	Lambert.	Lidgerwood.	Hand-power crab.	Petersburgh Iron Works.
(b) Number of drums.	2.	2.	2.	1.	2.
(c) Dimensions of cylinders.	6½ by 10 inches.	10½ by 12 inches.	8½ by 10 inches.	None.	7 by 10 inches.
(d) Diameter of rope.	1-inch wire.	1 inch.	1½ inches.	1 inch.	1½-inch manila.
23. Swinging engine:					
(a) Make.	Wright.	Lambert.	None.	None.	None.
(b) Number of drums.	1.	1.		do.	
(c) Dimensions of cylinders.	None, geared to hoisting engine.	8½ by 8 inches.		do.	
(d) Diameter of rope.	1-inch wire.	1 inch.		do.	

24. Boiler: (a) Height or length. (b) Diameter. (c) Heating surface. (d) Working pressure.	25. Height or length. 6 feet 4 inches. 550 square feet. 125 pounds.	26. Pay roll. 27. Supplies. 28. Repairs: (a) Hull. (b) Machinery. (c) Miscellaneous.	29. Total cost. 30. Number of men in crew. 31. Number of days under stream. 32. Work done during year and where operated.	Remarks.	Remarks.	Remarks.	Remarks.	Remarks.	Remarks.											
	23 feet. 6 feet 4 inches. 1,200 square feet. 225 pounds.	\$9,720.15 5,193.00 173.90 400.70	\$12,500.35 15. 147. (?)	1. Self propelled. 2. Boat was operated on Upper Columbia and Snake Rivers blasting rocks, removing boulders, raking gravel shoals, and making trips of inspection, as follows: (a) Drilling and blasting rocks: linear feet drilled, 2,245 feet; number of holes, 397; cubic yards blasted, 1,452; (b) dredging made with channel rake, No. 70; (c) total distance moved, 548 miles.	1. An additional engine (Lambert two-cylinder, 81 by 10 inches), drives lay shaft which operates spud drums and winch ends. 2. The boat was completed and delivered on Mar. 22; Mar. 24 to Apr. 10 the trial and tests called for in contract were made; boat was put in commission on Apr. 11; Apr. 11 to May 31 did embankment work (bucket dredging) on Potomac at Washington, resulting in 3,313 linear feet of embankments, in 16,312 cubic yards excavation, in 54 old piles pulled, and in 197 hours' work; June 1 to 15, undergoing repairs at navy yard; June 16 to 30, excavating pile bents, etc., of old Burnt bridge, 27 piles pulled; July 1 to 25 and Aug. 1 to 10,	28 days boring Cape Fear River below Wilmington, N. C., 116 days snagging in Black River, N. C., 84 days snagging northeast branch Cape Fear River.	Black River, N. C.: There were removed from the channel 775 large logs, 410 stumps, 1,194 snags, 383 saw logs, 532 trees, 83 cords small snags, and from the banks, 305 trees and 60 cords of brush were cut and hauled back. North East River, N. C.: There were removed from the channel, 848 large logs, 261 stumps, 1,152 snags, 593 saw logs, 364 trees, and 80 cords of small snags, and from the banks 18 trees were trimmed, and 267 trees and 381 cords of brush were cut and hauled back. Cape Fear River, N. C. below Wilmington: The holster was used for 28 days in making borings and handling pile, anchors, etc., at United States yard.	90 inches. 42 inches. 272 square feet. 75 pounds.	\$2,700.16 986.89 47.83 25.48 269.43	\$3,745.84 1. 228. (?)	28 days boring Cape Fear River below Wilmington, N. C., 116 days snagging in Black River, N. C., 84 days snagging northeast branch Cape Fear River.	Black River, N. C.: There were removed from the channel 775 large logs, 410 stumps, 1,194 snags, 383 saw logs, 532 trees, 83 cords small snags, and from the banks, 305 trees and 60 cords of brush were cut and hauled back. North East River, N. C.: There were removed from the channel, 848 large logs, 261 stumps, 1,152 snags, 593 saw logs, 364 trees, and 80 cords of small snags, and from the banks 18 trees were trimmed, and 267 trees and 381 cords of brush were cut and hauled back. Cape Fear River, N. C. below Wilmington: The holster was used for 28 days in making borings and handling pile, anchors, etc., at United States yard.	do. do. do. do.	\$46.67 2.50	\$49.17	This boat was used only 8 days during the year repairing Lock No. 17 valves. This boat is practically worthless.	9 feet 6 inches in height. 36 inches. 270 square feet. 100 pounds.	\$3,314.14 1,686.03 103.16 18.14 49.88	\$5,261.35	The holster Contoutula removed 348 obstructions from Pamlico and Tar Rivers, 59 obstructions from Fishing Creek, 383 obstructions from Contoutula Creek, 946 obstructions from Neuse River, 102 obstructions from Swift Creek, and 149 obstructions from Trent River. Total, 1,987. 1. Snagging on the various rivers in the Newbern (N.C.) subdistrict.

TABLE IX.—Report of operations of derrick boats for the calendar year ending Dec. 31, 1916—Continued.

1. Name, letter, or number.	Aerial.	Atlas.	Black.	"C."	Contentina.
		<p>Remarks.</p> <p>worked on construction of 415 linear feet of pilegrillage platform, 83 batter piles driven, caps, sills, and decking placed; July 26 to 31 and Aug. 11 to Sept. 15, worked on platform, sea wall, and on embankment work (buck dredging), on Anacostia River, D. C. the latter consisting of 4,918 linear feet, 5,270 cubic yards of excavation, and 80½ hours' work; Sept. 16 to Dec. 31, embankment work in Potomac at Washington, resulting in 9,611 linear feet of embankment, in 49,099 cubic yards of excavation, in pulling 3 old piles, and in 543½ hours' work.</p>	<p>Remarks.</p> <p>¹ The hoisting engine and boiler were on hand; \$166.41 for repairs; outfit cost \$118.34.</p>		

1. Name, letter, or number.	2. R.	3. Mfgs.	4. Monongahela.	5. Mary Ann.	6. No name.
2. District.....	Pittsburgh, Pa.....	First, Cincinnati, Ohio.....	Pittsburgh, Pa.....	Pittsburgh, Pa.....	Detroit, Mich.
3. Where built.....	Monongahela, Pa.....	Dubuque, Iowa.....	U. S. Boat Yard Lock 4, Pa.....	Monongahela, Pa.....	Do.
4. When built.....	1899.....	1912.....	1913-14.....	1892.....	1907.....
5. Builder.....	Nell Blythe Yards.....	Dubuque Boat and Roller Works.....	United States.....	Chas. Boston & Sons.....	Chas. Boston & Sons.
6. Time to build.....	Wood.....	12 months.....	Wood.....	6 months.....	3 months.
7. Material of hull.....	Steel.....	Steel.....	Wood.....	Wood.....	White oak and white pine.
8. Cost of hull.....	\$13,252.....	\$15,497.06.....	\$13,252.....	.....	\$3,600.
9. Cost of machinery.....	\$2,900.....	\$1,494.....	\$21,502.....	.....	\$1,000.
10. Total cost.....	\$200.....	\$23,500.....	\$19,350.....	.....	\$4,600.
11. Present value.....	50 feet.....	94 feet.....	120 feet.....	.....	\$2,800.
12. Length.....	22 feet.....	32 feet.....	28 feet.....	.....	76 feet 6 inches; bottom, 64 feet.
13. Beam.....	4 feet 2 inches.....	5 feet.....	3 feet 6 inches.....	.....	27 feet.
14. Depth.....	1 foot 8 inches.....	1 foot 11 inches.....	2 feet 3 inches.....	.....	6 feet 5 inches.
15. Draft forward.....	1 foot 4 inches.....	1 foot 11 inches.....	2 feet 3 inches.....	.....	2 feet.
16. Draft aft.....	47 tons.....	116.3 tons.....	227 tons.....	.....	4 feet.
17. Displacement.....	22 feet.....	21 feet.....	30 feet.....	.....	21 feet 6 inches; mast braced by two stiff legs.
18. Mast.....	14 by 14 inches.....	Two 12-inch channels, lat-tice connected.....	14 by 14 inches.....	.....	14 feet square; stiff legs, 29 feet 6 inches long, 14 inches square.
(a) Height.....	49 feet.....	35 feet 1 inch.....	65 feet.....	.....	34 feet 6 inches.
(b) Dimensions.....	14 by 14 inches.....	Four 5 by 4 inch angles.....	14 by 14 inches.....	.....	1 foot 3 inches by 1 foot 1 inch.
(c) How braced.....	Not braced.....	Plate and lattice.....	Truss rods and rods to bull wheel.....	.....	Not braced.
(d) Capacity in tons.....	5.....	30 tons.....	8 tons.....	.....	About 15.
20. Bull-wheel diameter.....	None.....	30 feet.....	12 feet.....	.....	None; too old to be operated.
21. Buckle.....	No regular type.....	Orange peel.....	Clamshell or orange peel.....	.....	None.
(a) Type.....	.....	14 cubic yards.....	14 cubic yards.....	.....	None.
(b) Capacity.....	.....	.....	.....	.....	None.
(c) Make.....	S. Flory Manufacturing Co.....	Lidgerwood.....	Mead-Morrison Co.....	.....	James Rees & Sons Co.....
(d) Number of drums.....	2.....	3.....	14 inches diameter, 24 inches long.....	.....	American Holt & Derrick Co.
(e) Dimensions of cylinders.....	7 inches diameter by 9-inch stroke.....	10 by 12.....	10 inches diameter, 12-inch stroke.....	.....	64 by 10 inches.
(f) Diameter of rope.....	4-inch wire.....	4-inch.....	4-inch boom and 3-inch hoisting wire lines.....	.....	4-inch.

FLOATING PLANT.

4275

1. Name, letter, or number.	No name.	Builder.	Specs.	Tallness.	Territory, Captain.
2. District.	Norfolk, Va.	Philadelphia, Pa.	Savannah, Ga.	Mobile, Ala.	Wheeling, W. Va.
3. Where built.	Great Bridge, Va.	(London, N. J.)	1894.	Truscloos, Ala.	Marietta, Ohio.
4. When built.	1907.	100 (rebuilt in 1914).	U. S. Engineer Department.	United States.	1910.
5. Builder.	Albemarle & Chesapeake Canal Co.	John H. Dialogue.	Unknown.	About 6 months.	J. M. Hammit.
6. Time to build.	30 days.	6 months.	Wood.	Wood.	About 5 months.
7. Material of hull.	Wood.	Wood.	Wood.	Wood.	Wood.
8. Cost of hull.	Not known.	\$4,500.	\$1,800.	\$3,539.	\$3,400.
9. Cost of machinery.	Not known.	\$2,687.28.	\$10,200.	\$2,783.	\$4,800.
10. Total cost.	do.	\$7,187.28.	\$12,000.	\$6,322.	\$8,200.
11. Present value.	do.	\$200.	\$2,000.	\$3,000.	\$5,000.
12. Length.	42 feet 11 inches.	88 feet.	89 feet 4 inches.	50 feet.	86 feet 9 inches.
13. Beam.	13 feet 11 inches.	32 feet.	30 feet 8 inches.	40 feet.	30 feet.
14. Depth.	3 feet 9 inches.	7 feet 3 inches.	5 feet 8 inches.	5 feet.	4 feet 6 inches.
15. Draft forward.	6 inches.	2 feet.	3 feet.	1 foot 6 inches.	1 foot 5 inches.
16. Draft aft.	1 foot 6 inches.	2 feet 6 inches.	3 feet.	1 foot 11 inches.	1 foot 10 inches.
17. Displacement.	19.	240 tons.	160 tons.	81 tons.	88 tons.
18. Mast.	25 feet.	33 feet.	33.4 feet.	40 feet.	38 feet 2 inches.
(a) Height.	9 inches diameter at top, 15 inches diameter at foot.	14 by 14 inches.	12 by 12 inches.	15 by 15 inches.	16 by 16 inches.
(b) Dimensions.					
19. Boom:	30 feet.	65 feet.	55 feet.	One 45 feet and one 70 feet.	60 feet.
(a) Length.	84 inches diameter.	12 by 12 inches.	12 by 12 inches.	13 by 13 inches.	12 by 14 inches.
(b) Dimensions.	Not braced.	Stouts.	1-inch round iron truss over 2-foot saddles.	Trussed with two 1-inch rods.	4 truss rods.
(c) How braced.			3 tons working capacity.	Long boom, 5 tons; short boom, 15 tons.	7.
(d) Capacity in tons.	3 tons.	10 tons.	9 feet 6 inches.	14 feet.	12 feet.
20. Roll-wheel diameter.	None.	Clamshell.	One 3-blade orange-peel; one 4-blade orange-peel.	Hayward clamshell, class E.	Orange-peel.
21. Bucket:	do.	1 yard.	3-blade, 21 cubic feet; 4-blade, 37 cubic feet.	1 yard.	1 yard.
(a) Type.					
(b) Capacity.					
22. Hoisting engine:	Lidgerwood.	Lidgerwood Manufacturing Co.	Lidgerwood.	Lidgerwood.	Lidgerwood.
(a) Make.	1.	3.	2 engines with two drums each.	2.	3.
(b) Number of drums.	1.	3.	One 84 by 10 inches; one 7 by 10 inches.	84 by 10 inch stroke.	84 by 10 inches.
(c) Dimensions of cylinders.	1, cylinder 64 by 94 inches.	8 by 10 inches.	1-inch wire.	4 inch.	4 inch.
(d) Diameter of rope.	1 inch.	1 inch.			

TABLE IX.—Report of operations of derrick boats for the calendar year ending Dec. 31, 1916—Continued.

1. Name, letter, or number.	2. Name.	3. Builder.	4. Supt.	5. Tally.	6. Tally, Captain.
23. Swinging engine: (a) Make.....	Name.....	Lidgerwood Manufacturing Co. 1..... 64 by 8 inches.....	J. T. Mundy..... 1 compound..... 64 by 10 inches..... 8 inch.....	American..... 1..... 64 by 6 inch stroke..... 8 inch.....	Lidgerwood. 1..... 84 by 10 inches..... 8 inch.....
24. Boiler: (a) Height or length..... (b) Diameter..... (c) Heating surface..... (d) Working pressure.....	7 feet 14 inches..... 3 feet..... 102 square feet..... 100 pounds.....	102 inches high..... 48 inches..... 361 square feet..... 100 pounds.....	8 feet 6 inches..... 4 feet..... 404 square feet..... 80 pounds.....	90 inches..... 42 inches..... 294 square feet..... 100 pounds.....	8 feet 6 inches high..... 50 inches..... 434 square feet..... 125 pounds.....
OPERATING COST.					
25. Pay roll.....	\$632.70	\$5,919.96	\$5,431.68	\$5,877.16	\$5,500.53
26. Supplies.....	96.50	4,297.30	4,300.63	1,961.83	266.74
27. Repairs: (a) Hull..... (b) Machinery..... (c) Miscellaneous.....	142.60 28.72 67.83	324.72 1,437.53 1,440.16	56.48 115.53	567.50 120.40	160.23 271.31 464.41
28. Total cost.....	\$1,028.35	\$13,416.77	\$9,904.32	\$8,526.89	\$6,633.32
29. Number of men in crew.....	173	310	223	171	10
30. Number of days under steam.....	See Remarks.	See Remarks.	See Remarks.	See Remarks.	170
31. Work done during year and where operated.	Not operated continually. Used in snagging Pokoty Creek, Va., and in clearing away the t of way of the Inland Waterway from Norfolk, Va., to Beaufort Inlet, N. C., in advance of work done with Government plant.	The derrick boat was engaged throughout the year in making test piers in Schuylkill River; test piers on (better and Marcus Hook Ranges and over the Manelike Rock area, Philadelphia Harbor; building 640 feet of pipe trestle for rehabilitating machine (stanch at Artificial Island; building stone retaining banks; new pier and bulkhead at port of Wilmington, Philadelphia, Pa.,	Ocmulgee River, 5,632 lineal feet of channel improved between mileages 136 and 162 to a depth of 4 feet during calendar year. Saple removed 6,976 cubic yards of rock, 10,666 cubic yards and 277 snags and cut 17 overhanging trees in making improvements. Laid up from June 20, 1916, to Sept. 20, 1916, on account of lack of funds. The Saple is a nonpropelling boat built by Hurd	This boat worked dredging with clamshell and orange-peel buckets, flood deposit from locks and approaches, removed 7,441 cubic yards of material. Also removed 6,153 cubic yards of rotten limestone from channel at Yellow (reel Bar, Hatcher Draw, and lower approach lock 6 after it had been blasted with dynamite making a total of 13,436 cubic yards of material removed.	Remarks. J. M. Hammett, Marietta, Ohio, contractor for hull machinery purchased by the United States and installed on Kanawha River. Finished cost with outfit. Employed in removing snags and other obstructions from the river, building cribs, and various repair work in connection with the operation of the Kanawha River.

and miscellaneous handling of heavy machinery and property for general maintenance plant, and sweeping contract dredged areas in Philadelphia Harbor.

labor in 1894, and originally fitted up as a steam hoister to remove mags, stumps, and overhanging trees. A new hull and house were built in 1901 and new machinery installed in 1907. It is now a barge fitted up with quarters, hoisting engine, and Heyward bucket, and is primarily equipped and used for removing broken rock, auxiliary plant being used for quarrying rock, breaking apparatus, and steam drill.

This boat with crew was also used in rebuilding guard cribe above water line at Lock No. 5. The crew also worked repairing telephone lines at Locks 5 and 6 and removing 1,316 trees from channel and banks.

TABLE IX.—Report of operations of derrick boats for the calendar year ending Dec. 31, 1916—Continued.

No. 1.	No. 1.	No. 1.	No. 1.	No. 1.
1. Name, letter, or number.				
2. District.				
3. Where built.				
4. When built.				
5. Builder.				
6. Time to build.				
7. Material of hull.				
8. Cost of hull.				
9. Cost of machinery.				
10. Total cost.				
11. Present value.				
12. Length.				
13. Beam.				
14. Depth.				
15. Draft forward.				
16. Draft aft.				
17. Displacement.				
18. Mast:				
(a) Height.				
(b) Dimensions.				
19. Boom:				
(a) Length.				
(b) Dimensions.				
(c) How braced.				
(d) Capacity in tons.				
20. Bull-wheel diameter.				
21. Bucket:				
(a) Type.				
(b) Capacity.				
22. Hoisting engine:				
(a) Make.				
(b) Number of drums of cylinders.				
(c) Dimensions of cylinders.				
(d) Diameter of rope.				
(e) Make.				
(f) Number of drums of cylinders.				
(g) Dimensions of cylinders.				
(h) Diameter of rope.				

24. Boats:	(a) Freight or length. (b) Diameter. (c) Hoisting surges. (d) Working pressure	26 feet length. 72 inches. 2,000 square feet. 210 pounds.	7 feet 1 inch. 36 inches. 200 square feet. 125 pounds.	7 feet 1½ inches. 38 inches. 184.91 square feet. 100 pounds.	8 feet 6 inches. 4 feet. 523½ square feet. 100 pounds.	Do.
25. Pay roll.....	96,464.26	\$1,330.00 315.00	\$1,023.82 513.35	\$1,191.61 762.63	\$2,330.02	No crew. No steam.
26. Supplies.....	4,471.73					
27. Repairs:						
(a) Hull.....	4.67					
(b) Machinery.....	72.50	\$1,955.00	173½	65.56 310.22	(c)	Remarks. Michigan City Harbor, Ind., repairs to piers and breakwaters.
28. Miscellaneous.....	596.34					
29. Total cost.....	\$11,672.80	8.	4.	6.	9.	\$69.40
30. Number of men in crew.....	133.	90.	173½	39.	39.	
31. Number of days under steam.....	(c)	(c)	(c)	(c)	(c)	
32. Work done during year and where operated.	Remarks. 1 Self propelled. 2 Boat was operated on Upper Columbia and Snake Rivers towing, making trips of inspection, and building rock dikes, removing boulders, and raking gravel shoals, as follows: (a) Building dikes, rock placed; tons, 1,360. Length of dikes, 480 feet. (b) Drags made with channel rake, No. 45. (c) Total distance traveled, 1,104 miles.	Remarks. 1 Loaded 7,500 tons of riprap stone at Arkansas City, Ark.	Remarks. 1 Exclusive of Sundays and holidays. 2 Rebuilding piers at Great Sodus and Little Sodus Harbors.	Remarks. 1 Dredging: 676 cubic yards stone, upper channel, Congaree River, S. C.; 107 cubic yards sand, 2 miles below lock, Congaree River, S. C.; 170 cubic yards stone and clay, Peterkins Field, Congaree River, S. C.; 2,506 cubic yards sand, upper channel, Congaree River, S. C.; total, 3,459 cubic yards material dredged. Snagging: 43 snags from Congaree Creek to lock, Congaree River, S. C.		

TABLE IX. — *Report of operations of derrick boats for the calendar year ending Dec. 31, 1916—Continued.*

1. Name, letter, or number.	No. 1.	No. 1.	No. 1.	No. 1, G. & B.	No. 1, O. R.
2. District.....	First, Cincinnati, Ohio.	Cleveland, Ohio.....	Galveston, Tex.....	Louisville, Ky.....	Louisville, Ky.
3. Where built.....	Jeffersonville, Ind.	Superior Entry, Wis.	1908 do.....	Woodbury, Ky.....	Jeffersonville, Ind.
4. When built.....	1914.	1906.	1908 do.....	1910.	1914.
5. Builder.....	Ed. J. Howard.	United States.....	John Bludworth.	United States.....	Ed. J. Howard (hull).
6. Time to build.....	4 months.	6 months.	3 months.	2 months (about).	3 months.
7. Material of hull.....	Steel.	Wood.	Wood.	Wood.	Steel.
8. Cost of hull.....	\$5,500.	\$6,124.	\$3,250.	\$2,778.30.	\$5,000.
9. Cost of machinery.....	\$6,324.08.	\$5,736.	\$8,800.	Not known. machinery transferred from old boat.	\$7,126.36.
10. Total cost.....	\$12,324.08.	\$11,920.	\$11,050.	Not known.	\$12,726.36.
11. Present value.....	\$10,000.	\$9,700.	\$5,500.	\$2,200.	\$13,000.
12. Length.....	70 feet.	102 feet 6 inches.	65 feet.	70 feet.	70 feet.
13. Beam.....	22 feet.	32 feet.	27 feet.	20 feet.	32 feet.
14. Depth.....	9 feet.	7 feet 10 inches.	5 feet 6 inches.	4 feet.	5 feet.
15. Draft forward.....	2 feet 6 inches.	2.18 feet.	2 feet 5 inches.	1 foot 7½ inches.	2 feet 5 inches.
16. Draft aft.....	2 feet.	185 tons.	2 feet 6 inches.	do.	1 foot 9 inches.
17. Displacement.....	107.10 tons.	185 tons.	115 tons.	76 long tons.	131 long tons.
18. Mast.....	35 feet.	30 feet.	.....	35 feet 11 inches.	33 feet 34 inches.
(a) Height.....	14 by 14 inches.	Double A, four, 12 by 12 inch timbers.	.....	13½ by 13½ inches.	22 by 3 feet, steel, double lat-faced.
19. Boom.....	62 feet.	40 feet 6 inches.	43 feet.	68 feet.	65 feet.
(a) Length.....	14 by 14 inches.	2 Diamond trusses, 3 feet 6 inches deep in middle.	14 by 16 inches.	14 by 15½ inches.	2 feet 4 inches by 2 feet 4 inches, steel, double lat-faced.
(b) Dimensions.....	Trussed, 4 rods, queen post.	Trusses, 10 feet 2 inches apart at bottom.	A. frame and sheer legs.	No bracing.	No bracing.
(c) How braced.....	10 feet.	18 feet.	20.	7.	15.
(d) Capacity in tons.....	16 feet.	None, revolving steel platform, 20-foot diameter.	None.	11 feet 6 inches.	15 feet 4 inches.
20. Bull-wheel diameter.....	Orange peel.	None.	Hayward clamshell, type E. 14 yards.	None.	Clamshell.
21. Bucket.....	Mundy.....	Lambert.	Lidgerwood.	Mundy.	Mundy.
(a) Type.....	10 by 13 inches.	84 by 10 inches.	10 by 12 inches.	7½ by 10 inches.	10 by 13 inches.
(b) Capacity.....	¾ inch.	¾ by ¾ inch wire.	¾ inch and ¾-inch wire rope.	1 and ¾ inch.	¾ inch.
22. Hoisting engine.....	American.	Superior Iron Works.	None.	Lidgerwood.	Mundy.
(a) Make.....	1.	5 by 6 inches.	1.	1.	1.
(b) Number of drums.....	6 by 7 inches.	¾-inch wire.	¾-inch wire.	¾ inch.	¾ inch.
(c) Dimensions of cylinders.....	.....	.....	.....	.....	.....
(d) Diameter of rope.....	.....	.....	.....	.....	.....
(e) Make.....	.....	.....	.....	.....	.....
(f) Number of drums.....	.....	.....	.....	.....	.....
(g) Dimensions of cylinders.....	.....	.....	.....	.....	.....
(h) Diameter of rope.....	.....	.....	.....	.....	.....

24. Boiler:	8 feet. 4 feet. 125 pounds.	90 inches. 42 inches. 29.1 square feet. 100 pounds.	8 feet 6 inches high. 4 feet 5 inches 452 square feet. 100 pounds per square inch.	7 feet 6 inches 3 feet 4 inches 229 square feet. 100 pounds.	12 feet 104 inches in length. 6 feet. 600 square feet. 125 pounds.
25. Pay roll.....	\$1,55.50	\$1,845.73	\$2,345.91	\$1,544.95	\$3,742.40
26. Supplies.....	545.18	183.47	1,016.71	226.70	707.35
27. Repairs:					
(a) Hull.....	331.59	25.31	75	142.56	224.68
(b) Machinery.....	943.24	89.35	35.12	1,846.18	1,372.94
28. Miscellaneous.....	20.06	86.97	685.73	1.91	
29. Total cost.....	\$2,015.57	\$2,200.83	\$4,034.22	\$2,762.30	\$6,047.37
30. Number of men in crew.....	2.	61.	19.	2 to 4.	3.
31. Number of days under steam.....	347.	163.	No record.	242.	293.
32. Work done during year and where operated.	(*)	(*)	(*)	See remarks.	Handling material, Dam 43, Ohio River.
	Remarks.	Remarks.	Remarks.	Remarks.	Remarks.
	Per shift. Filling, bunting, and re- moving cofferdam and han- dling materials at Lock and Dam No. 39, Ohio River.	Including diver and tender. Driving concrete piles, storehouse addition, Cleve- land, Ohio. Sweeping and rock removal, old west breakwater, Conneaut, Ohio.	In January repaired beacons, etc., in Houston ship channel; also removed 93 stumps from upper Clin- ton Island, recovered pon- toons, and drove piling. In February removed 34 large snags, 3 small snags, and 283 overhanging trees from islands near Clinton and Constitution Bend; re- moved wreck of small ferry- boat. In March removed 380 stumps and snags from the islands, and other mis- cellaneous work. Derrick berge was laid up Apr. 6.	Assisted in repair work at the several locks on Green and Barren Rivers, K.Y., and in the construction of the navigable pass at Dam No. 43, Ohio River. Includes cost of new swinging engine.	House and machinery installed by the United States. Includes cost of installa- tion and house. Includes cost of installa- tion of electric lighting system.

TABLE IX.—*Report of operations of derrick boats for the calendar year ending Dec. 31, 1916—Continued.*

1. Name, letter, or number.	No. 1.	No. 1.	No. 1.	No. 1, M.R.	No. 1, O. R.
2. District.	Milwaukee, Wis.	New Orleans, La.	New Orleans (fourth Mississippi River).	Pittsburgh, Pa.	Pittsburgh, Pa.
3. Where built.	do.	Port Eads, La.	New Orleans, La.	Lock 4, Pennsylvania.	Lock 4, Pennsylvania.
4. When built.	1903.	1903.	1900.	1916.	1910.
5. Builder.	Unknown.	Engineer Department.	U. S. Engineers.	United States.	United States.
6. Time to build.	do.	4 months.	3 months.	3 months.	3 months.
7. Material of hull.	Wood.	Wood.	Crescoted wood.	Wood.	Wood.
8. Cost of hull.	\$2,000.	\$2,000.	\$3,800.	\$3,761.	\$4,597.
9. Cost of machinery.	\$1,540.30.	\$1,520.	\$3,800.	\$2,659.	\$2,188.
10. Total cost.	\$3,540.30.	\$3,520.	\$7,600.	\$6,423.	\$6,785.
11. Present value.	\$1,100.	\$2,000.	\$6,700.	\$6,423.	\$4,500.
12. Length.	66 feet 6 inches.	63 feet.	100 feet.	70 feet.	71 feet.
13. Beam.	29 feet 6 inches.	24 feet.	30 feet.	28 feet.	30 feet 7 inches.
14. Depth.	5 feet 10 inches.	5 feet.	4 feet 9 inches.	3 feet 8 inches.	4 feet.
15. Draft forward.	1 foot 2 inches.	2 feet.	1 foot 9 inches.	1 foot 5 inches.	1 foot 9 inches.
16. Draft aft.	2 feet 4 inches.	2 feet.	1 foot 9 inches.	1 foot 7 inches.	1 foot 3 inches.
17. Displacement.	81.5 tons.	78 tons.	142 tons.	86 tons.	87 tons.
18. Mast:					
(a) Height.	30 feet.	31.5 feet.	50 feet.	37 feet.	35 feet 8 inches.
(b) Dimensions.	14 by 14 inches.	12 by 12 inches to 16 by 16 inches.	14 by 14 inches.	14 by 14 inches.	14 by 14 inches.
19. Boom:					
(a) Length.	55 feet.	52 feet.	75 feet.	65 feet.	53 feet.
(b) Dimensions.	14 by 14 inches.	12 by 12 inches.	12 by 12 inches.	14 by 14 inches.	14 by 14 inches.
(c) Flow braced.	Not braced.	Stiff legs and chain; jaws at bottom.	Truss rods.	With hog chains, four ways.	4 hog rods, one on each side.
(d) Capacity in tons.	5.	3.	10.	5.	8.
20. Bull-wheel diameter.	12 feet 24 inches.	15 feet.	16 feet.	14 feet.	12 feet.
21. Bucket:					
(a) Type.	Clamshell; orange peel.	Self dumping.			No regular bucket.
(b) Capacity.	4 yard each.	24 cubic feet.			
22. Hoisting engine:					
(a) Make.	J. S. Mundy.	Lidgerwood.	Lambert.	American Holst & Derrick Co.	S. Flory Mfg. Co.
(b) Number of drums.	3.	2.	3.	3.	3.
(c) Dimensions of cylinders.	74 by 10 inches.	84 by 10 inches.	84 by 10 inches.	84 by 10 inches.	10-inch diameter by 12-inch stroke.
(d) Diameter of rope.	4 inch.	4-inch cable.	4-inch steel.	4-inch wire rope.	4-inch wire.
22. Swinging engine:					
(a) Make.	None.	Part of hoisting engine.	On main engine.	American Holst & Derrick Co.	S. Flory Mfg. Co.
(b) Number of drums.		2.	2.	1.	1.
(c) Dimensions of cylinders.		Part of hoisting engine.	Part of hoisting engine.	4 by 6 inches.	7-inch diameter by 10-inch stroke.
(d) Diameter of rope.		5/4-inch cable.	4-inch steel.	4-inch wire rope.	4-inch wire.

FLOATING PLANT.

4263

24. Boiler:				7 feet 6 inches				16 feet long.				8 feet 6 inches high.				9 feet high.			
(a) Height or length.				3 feet 4 inches				44 inches.				46 inches.				54 inches.			
(b) Diameter.				320 square feet.				40 square feet.				100 pounds.				627 square feet.			
(c) Heating surface.				100 pounds.				100 pounds.				100 pounds.				100 pounds.			
(d) Working pressure																			
OPERATING COST.																			
25. Pay roll				\$337.00				\$645.00				\$772.00				\$1,000.00			
26. Supplies				145.00				32.00				(1)				80.00			
27. Repairs				182.08				12.00				(1)							
(a) Fuel				490.98				180.00											
(b) Machinery				240.00															
(c) Miscellaneous																			
28. Total cost				\$1,801.06				\$209.00				\$312.91				\$1,000.00			
29. Number of men in crew				2				2				2				3 to 5.			
30. Number of days under way				45				190				158				300			
31. Work done during year and where operated.				Handling piles and timbers and cooling dredges at South Pass, Mississippi River.				Large at Engineer Depot.				(1)				3 to 5.			
Remarks.																			
At Kenoche, Wis. removing old superstructure and replacing same with concrete on 478 linear feet. 16-foot pile pier. 450 linear feet of 18-foot pile pier and 150 linear feet of 21-foot crib pier.																			
At Sturgeon Bay Canal, Wis., between stations 42 and 52 south side. Approximately 800 cubic yards of sand was removed from behind revetment and placed behind revetment at such places where filling was needed; 1,000 linear feet of revetment was sawed off and the 6 by 12 inch fillers and binders put in place.																			
Remarks.																			
1. No record.																			
2. Assisting in the general construction work on new lock and dam No. 6, Monongahela River.																			
3. Supplied from regular lock force when needed.																			
4. Used as maneuver boat at dam No. 1, Ohio River, and in connection with regular work at dams Nos. 1 to 10; 1 engine man is assigned to regular duty.																			

TABLE IX — *Report of operations of derrick boats for the calendar year ending Dec. 31, 1916—Continued.*

1. Name, letter, or number	No. 1.	No. 1.	No. 1.	No. 1, M. R. C.	No. 1.
2. District	First Portland, Ore.	Second Portland, Ore.	St. Louis, Mo.	St. Louis, Mo.; and Mississippi River Commission.	Vicksburg, Miss.
3. Where built	Coos Bay, Ore.	Portland, Ore.	do.	Hull, Jeffersonville, Ind.; deck house, West Memphis, Ark.	Do.
4. When built	1890; new hull, 1903	1913.	1893.	1914.	1909.
5. Builder	Unknown.	Chas. Nelson	Sam'l. W. Coffin & Son.	Hull, Ed. J. Howard; derrick and machinery, Minneapolis Steel & Machinery Co.	United States
6. Time to build.	do.	8 months.	Not known.	About 1 year.	About two months.
7. Material of hull.	Wood.	Wood.	Wood.	Steel.	Wood.
8. Cost of hull.	\$2,000.	\$1,678.	\$1,500.	\$7,775.	\$2,901.
9. Cost of machinery.	\$1,785.	\$1,028.	\$2,500.	\$6,394.22.	\$399.
10. Total cost.	\$3,785.	\$2,706.	\$4,000.	\$14,171.22.	\$3,200.
11. Present value.	\$300.	\$2,050.	\$1,700.	\$12,200.	\$1,500.
12. Length.	65 feet.	51 feet.	68 feet.	87 feet.	95 feet (over all).
13. Beam.	28 feet 5 inches.	22 feet 6 inches.	27 feet.	36 feet.	32 feet.
14. Depth.	3 feet 10 inches.	2 feet 10 inches.	3 feet 1½ inches.	5 feet.	2 feet 6 inches.
15. Draft forward.	1 foot.	1 foot 5 inches.	1 foot.	1 foot.	1 foot 2 inches.
16. Draft aft.	1 foot.	1 foot 8 inches.	1 foot 7 inches.	2 feet.	1 foot 2 inches.
17. Displacement.	51 tons.	42 tons.	75 tons.	132 long tons.	106.55 long tons.
18. Mast:					
(a) Height.	29 feet.	No mast, A frame.	45 feet.	43 feet.	15 feet.
(b) Dimensions.	15 by 15 inches.	20 feet high.	Pile—butt, 10 inches square; top, 9 inches diameter.	Two luffed 15-inch channels, 33 pounds.	12 by 12 inches.
19. Boom:					
(a) Length.	48 feet.	None.	52 feet.	70 feet.	40 feet.
(b) Dimensions.	16 by 16 inches.	None.	Butt, 11½ inches square; top, 9 inches diameter.	4 angles, 4 by 4 by ½ inch.	10 by 10 inches.
(c) How braced.	None.	None.	2.	Latticed.	5.
(d) Capacity in tons.	12.	None.	None.	15.	10 feet.
20. Bull-wheel diameter.	None.	None.	None.	20 feet.	6.
21. Bucket:					
(a) Type.	Pige.	do.	do.	Orange peel.	Orange peel.
(b) Capacity.	1½ cubic yards.	do.	do.	15 cubic feet.	1 cubic yard.
(c) Hoisting engine.	Mundy.	Mundy.	Lidgerwood.	Minneapolis Steel & Machinery Co.	Lidgerwood.
(d) Make.					
(b) Number of drums.	2.	2.	2.	3.	2.
(c) Dimensions of cylinders.	8 by 12 inches.	7½ by 13 inches.	7 by 12 inches.	8½ by 10 inches.	8½ by 10 inches.
(d) Diameter of rope.	½ inch wire.	½ inch.	½ inch wire.	½ inch.	½ inch wire.

23. Swing engine: (a) Make.....	None.....	None.....	None.....	Minneapolis Steel & Machinery Co. 64 by 10 inches. 3 inch. Height, 9 feet. 42 inches. 250 square feet. 125 pounds.	Lidgerwood. 2 64 by 10 inches. 3 inch wire. 14 feet. 3 feet 6 inches. 300 square feet. 180 pounds.
24. Boiler: (a) Height or length. (b) Diameter. (c) Heating surface. (d) Working pressure.	98 inches. 45 inches. 250 square feet. 110 pounds.	96 inches high. 42 inches. 250 square feet. 100 pounds.	Length, 14 feet. 42 inches. 250 square feet. 180 pounds.		
OPERATING COST.					
25. Pay roll.....			\$310.79		\$2,532.10
26. Supplies.....			123.56		2,107.12
27. Repairs: (a) Hull. (b) Machinery.					324.60 166.48 2.22
28. Miscellaneous.....			63.32	\$331.42	
29. Total cost.....					\$5,143.92
30. Number of men in crew.....			1 to 16.	\$503.17	17.
31. Number of days under steam.....			45.		77.
32. Work done during year and where operated.	Remarks. This boat was out of commission during the year.	Remarks. (1) Used in connection with operation of pipeline design Multnomah; cost of operation included in cost of operation of dredge.	Remarks. Mississippi River between mouths Ohio and Missouri Rivers. 520 cubic yards stone unloaded for paving bank; 916 piles imbedded or transferred; 21 days, pumping plant and cleaning boilers of working plant.	Remarks. No regular crew on deck, but operated when needed by dredge fleet employed at West Memphis, Ark.	Remarks. Employed in Big Sunflower River, Miss.; 6 snags killed; 25 stumps pulled; 23 store mounds removed from bank; 212 trees cut; 64 large trees cut; 100 piles of wing dams built; 3,483 cubic yards of material dredged from channel.

TABLE IX. — *Report of operations of derrick boats for the calendar year ending Dec. 31, 1916—Continued.*

1. Name, letter, or number.	No. 2.		No. 2.		No. 2, G. and E.		No. 2, O. E.	
	Buffalo, N. Y.	First Cincinnati, Ohio.	Galveston, Tex.	Louisville, Ky.	Louisville, Ky.	Louisville, Ky.	Louisville, Ky.	Louisville, Ky.
2. District.	Oswego, N. Y.	Jeffersonville, Ind.	Victoria, Tex.	Woodbury, Ky.	Jeffersonville, Ind.	Jeffersonville, Ind.	Jeffersonville, Ind.	Jeffersonville, Ind.
3. Where built.	1905.	1914.	1915.	1910.	1914.	1914.	1914.	1914.
4. When built.	U. S. Engineer Department.	Ed. J. Howard.	U. S. Engineer Department.	United States.	Ed. J. Howard (hull).	Ed. J. Howard (hull).	Ed. J. Howard (hull).	Ed. J. Howard (hull).
5. Builder.	4 months.	4 months.	5 months.	2 months (about).	3 months.	3 months.	3 months.	3 months.
6. Time to build.	Wood.	Steel.	Yellow pine.	Wood.	Steel.	Steel.	Steel.	Steel.
7. Material of hull.	\$3,400.	\$5,500.	\$3,563.39.	\$2,279.30.	\$5,900.	\$5,900.	\$5,900.	\$5,900.
8. Cost of hull.	\$1,400.	\$6,802.27.	\$6,098.05.	of known machinery transferred from old boat.	\$7,128.38.	\$7,128.38.	\$7,128.38.	\$7,128.38.
9. Cost of machinery.	\$5,000.	\$12,302.27.	\$10,642.33.	of known.	\$12,680.91.	\$12,680.91.	\$12,680.91.	\$12,680.91.
10. Total cost.	\$2,400.	\$10,000.	\$10,650.	\$2,300.	\$13,000.	\$13,000.	\$13,000.	\$13,000.
11. Present value.	78 feet.	70 feet.	65 feet.	70 feet.	71 feet.	71 feet.	71 feet.	71 feet.
12. Length.	28 feet.	32 feet.	28 feet.	28 feet.	32 feet.	32 feet.	32 feet.	32 feet.
13. Beam.	6 feet 3 inches.	5 feet.	5 feet.	4 feet.	5 feet.	5 feet.	5 feet.	5 feet.
14. Depth.	1 foot 3 inches.	1 foot 6 inches.	2 feet 1 inch.	1 foot 7 1/2 inches.	2 feet 5 inches.	2 feet 5 inches.	2 feet 5 inches.	2 feet 5 inches.
15. Draft forward.	2 feet 2 1/2 inches.	2 feet.	2 feet 2 inches.	1 foot 7 1/2 inches.	1 foot 9 inches.	1 foot 9 inches.	1 foot 9 inches.	1 foot 9 inches.
16. Draft aft.	65 tons.	108 10 tons.	102 tons.	76 long tons.	131 long tons.	131 long tons.	131 long tons.	131 long tons.
17. Displacement.	35 feet.	35 feet.	38 feet 9 inches.	38 feet 9 inches.	33 feet 3 1/2 inches.	33 feet 3 1/2 inches.	33 feet 3 1/2 inches.	33 feet 3 1/2 inches.
18. Mast.	(a) Height.	(a) Height.	(a) Height.	(a) Height.	(a) Height.	(a) Height.	(a) Height.	(a) Height.
	(b) Dimensions.	(b) Dimensions.	(b) Dimensions.	(b) Dimensions.	(b) Dimensions.	(b) Dimensions.	(b) Dimensions.	(b) Dimensions.
19. Boom:	48 feet.	62 feet.	40 feet.	68 feet.	65 feet.	65 feet.	65 feet.	65 feet.
(a) Length.	14 by 14 inches.	12 by 12 inches.	12 by 12 inches.	14 by 13 inches.	2 feet 4 inches by 2 feet 4 inches.	2 feet 4 inches by 2 feet 4 inches.	2 feet 4 inches by 2 feet 4 inches.	2 feet 4 inches by 2 feet 4 inches.
(b) Dimensions.	Not braced.	Trussed, 4 rods, queen post.	Shear legs and A frame.	None.	No bracing.	No bracing.	No bracing.	No bracing.
20. Capacity in tons.	10.	10.	15.	7.	15.	15.	15.	15.
(d) Capacity in tons.	14 feet.	16 feet.	None.	11 feet 9 inches.	15 feet 4 inches.	15 feet 4 inches.	15 feet 4 inches.	15 feet 4 inches.
21. Bucket:	Orange peel.	Clamshell (Williams).	do.	Orange peel.	Clamshell.	Clamshell.	Clamshell.	Clamshell.
(a) Type.	1 1/2 cubic yards.	1 1/2 cubic yards.	1 cubic yard.	1 cubic yard.	1 1/2 cubic yards.	1 1/2 cubic yards.	1 1/2 cubic yards.	1 1/2 cubic yards.
(b) Capacity.	Contractors Plant Mfg. Co.	Mundy.	Mundy.	Mundy.	Mundy.	Mundy.	Mundy.	Mundy.
(c) Make.	2.	3.	2.	3.	3.	3.	3.	3.
(d) Number of drum.	6 1/2 by 10 1/2 inches.	10 by 13 inches.	7 1/2 by 12 inches.	8 1/2 by 12 inches.	10 by 13 inches.	10 by 13 inches.	10 by 13 inches.	10 by 13 inches.
(e) Dimensions of cylinders.	1 inch.	1 inch.	1 inch wire rope.	1 and 1 1/2 inch.	1 inch.	1 inch.	1 inch.	1 inch.
(f) Diameter of rope.	Lid gerwood.	American.	None.	Lid gerwood.	Mundy.	Mundy.	Mundy.	Mundy.
(g) Make.	1.	1.	1.	1.	1.	1.	1.	1.
(h) Number of drum.	6 by 8 inches.	6 by 7 inches.	None.	5 by 6 inches.	6 1/2 by 10 inches.	6 1/2 by 10 inches.	6 1/2 by 10 inches.	6 1/2 by 10 inches.
(i) Dimensions of cylinders.	1 inch.	1 inch.	1 inch.	1 inch.	1 inch.	1 inch.	1 inch.	1 inch.
(j) Diameter of rope.								

34. Boiler:	(a) Height or length.	8 feet 11½ inches.	7 feet 1 inch.	8 feet 5 inches.	12 feet 10½ inches in length.
	(b) Diameter.	35½ inches.	3 feet 3 inches.	3 feet 8 inches.	6 feet.
	(c) Heating surface.	250 square feet.	260 square feet.	308 square feet.	600 square feet.
	(d) Working pressure.	100 pounds.	125 pounds per square inch.	100 pounds.	125 pounds.
OPERATING COST.					
25. Pay roll.		1 85.50	\$2,002.32	\$1,536.05	\$9,481.53
26. Supplies.		481.74	2,514.97	187.78	1,704.45
27. Repairs:					
(a) Hull.		539.96	494.28	161.00	214.21
(b) Machinery.		1,468.41	8.40	1,302.35	+1,566.36
28. Miscellaneous.		1.50	657.81	12.99	
29. Total cost.	\$404.84	\$2,515.11	\$5,709.78	\$3,200.77	\$5,966.55
30. Number of men in crew.				2 to 4.	3.
31. Number of days under steam.				212.	292.
32. Work done during year and where operated.				See Remarks.	Handling materials, Dam 43, Ohio River.
	Remarks.	Remarks.	Remarks.	Remarks.	Remarks.
This scow was used only as a material scow.	Per shift. : Filling, banking, and removing cofferdams and handling materials at Lock and Dam No. 39, Ohio River.	Laid up during January and February. In March plant was made ready for work and during April, May, and to 17th of June, when it was again laid up, removed a total of 342 large snags and 102 small snags. Worked from mouth of Guadalupe River to Mile 37.		Assisted in repair work at the several locks on Green and Barren Rivers, Ky., removed deposit from the approaches to Lock No. 1, Rough River, Ky., and removed snags from the Rough River pool. : Includes cost of new swinging engine.	: House and machinery installed by the United States. : Includes cost of installation and house. : Coal, etc. : Includes cost of installation of electric lighting plant.

TABLE IX. — *Report of operations of derrick boats for the calendar year ending Dec. 31, 1916—Continued.*

1. Name, letter, or number.	No. 2.	No. 2.	No. 2, M. E.	No. 2.	No. 2.
2. District.	Milwaukee, Wis.	New Orleans (fourth Mississippi River).	Pittsburgh, Pa.	First, Portland, Ore.	Second, Portland, Ore.
3. Where built.	Sturgeon Bay, Wis.	New Orleans, La.	Lock 4, Pa.	North Bend, Ore.	Portland, Ore.
4. When built.	1908.	1910.	1902.	1910.	1913.
5. Builder.	Rieboldt, Walter & Co.	U. S. Engineers.	United States.	Kruss & Banks.	Chas. Nelson.
6. Time to build.	3 months.	3 months.	Wood.	2 months.	8 months.
7. Material of hull.	Wood.	Crossed wood.	Wood.	Wood, Oregon fir.	Wood.
8. Cost of hull.	\$3,900.	\$2,077.82.	\$2,744.37.	\$2,830.	\$1,673.
9. Cost of machinery.	\$1,725.	\$2,506.67.	\$2,830.	\$2,830.	\$1,028.
10. Total cost.	\$5,625.	\$4,584.49.	\$5,574.37.	\$2,700.	\$2,706.
11. Present value.	\$3,400.	\$4,150.	\$2,000.	70 feet.	\$2,050.
12. Length.	84 feet 2 inches.	100 feet.	70 feet 6 inches.	30 feet.	51 feet.
13. Beam.	27 feet 4 inches.	30 feet.	28 feet 6 inches.	4 feet.	22 feet 6 inches.
14. Depth.	6 feet 8 inches.	4 feet 9 inches.	4 feet.	1 foot 4 inches.	2 feet 10 inches.
15. Draft for yard.	2 feet 3 inches.	1 foot 8 inches.	1 foot 9 inches.	1 foot 4 inches.	1 foot 5 inches.
16. Draft aft.	2 feet 3 inches.	1 foot 5 inches.	1 foot 4 inches.	1 foot 4 inches.	1 foot 8 inches.
17. Displacement.	131 long tons.	128 tons.	70 tons.	84 tons.	42 tons.
18. Mast:					
(a) Height.	29 feet.	40 feet.	23 feet.	38 feet.	No mast.
(b) Dimensions.	14 by 14 inches.	14 by 14 inches.	14 by 14 inches.	14 inches square.	
19. Boom:					
(a) Length.	50 feet.	60 feet.	71 feet.	60 feet.	None.
(b) Dimensions.	14 by 14 inches.	12 by 12 inches.	13 by 13 inches.	14 by 15 inches.	
(c) How braced.	Chains to bull wheel.	4 truss rods.	4 corner hog rods.	None.	
(d) Capacity in tons.	5.	10.	5.	10.	
20. Bull-wheel diameter.	12 feet.	16 feet.	12 feet.	12 feet.	Do.
21. Bucket:					
(a) Type.	Hayward clamshell.	Hayward clamshell.	No regular bucket.	Hayward.	Do.
(b) Capacity.	1 cubic yard.	1 cubic yard.		1 cubic yard.	
22. Hoisting engine:					
(a) Make.	American Hoist & Derrick Co.	American Hoist & Derrick Co.	Lambert Hoisting Engine Co.	Lidgerwood.	Mundy.
(b) Number of drums.	2.	3.	2.	2.	2.
(c) Dimensions of cylinders.	7 by 10 inches.	84 by 10 inches.	7 1/4 inches diameter by 10-inch stroke.	84 by 10 inches.	7 1/4 by 12 inches.
(d) Diameter of rope.	1-inch wire cable.	1-inch steel.	1-inch wire.	1-inch wire.	1-inch.
23. Swinging engine:					
(a) Make.	Attachment to main engine.	Attachment to main engine.	Lidgerwood Mfg. Co.	None.	None.
(b) Number of drums.	2.	2.	1.		
(c) Dimensions of cylinders.	None.	None.	5 inches diameter by 4-inch stroke.		
(d) Diameter of rope.	1-inch steel.	1-inch steel.	1-inch wire.		

Boiler: (a) Diameter. (b) Height or length. (c) Working pressure. (d) Working pressure.	7 feet 9 inches. 3 feet 7 inches. 385 square feet. 100 pounds.	14 feet long. 44 inches. 400 square feet. 80 pounds.	10 feet 6 inches high. 44 inches. 225 square feet. 100 pounds.	90 inches. 42 inches. 220 square feet. 100 pounds.	86 inches high. 42 inches. 220 square feet. 100 pounds.
25. Pay roll.....	\$108.00	\$1,830.08	\$1,848.08	\$2,821.16	(1)
26. Supplies.....	98.42	383.18	707.10	1,768.78	(2)
27. Repairs.....					(3)
(a) Fuel.....	185.03	112.96		82.65	(4)
(b) Machinery.....	25.00	156.20	97.34	92.27	(5)
28. Miscellaneous.....		9.44		113.81	(6)
29. Total cost.....	\$506.45	\$2,501.86	\$2,122.52	\$4,850.67	(7)
30. Number of men in crew.....	70.	139	217	134	8; 1 man for each of 3 shifts.
31. Number of days undrained.....	See Remarks.	Dredged 8,735 cubic yards run-off-bars and and gravel.	(1)	(2)	(3)
32. Work done during year and winter operated.	Remarks. Sturgeon Bay Canal, Wis., in making repairs to canal re- tentions on the north side, 260 linear feet of concrete re- tention was mottled. On the south side, 125 17-foot tie rods were removed and rods placed; 125 21-foot tie rods put in place; 1,000 linear feet each of 12 by 12 inch cap and wale timber put in place and bolted.	Remarks. Dredged gravel at Kempe Township, for concrete bal- last and concrete-bank pav- ing. High-water protection work on Cowpen Neck Levee, Giles Bend, Miss. Unloading gravel for re- pairing concrete paving on levees at Myrtle Grove, Socor- ra, and Star.	Remarks. Used for general hoisting work in rebuilding Lock and Dam No. 4, Monongahela River.	Remarks. This derrick boat was op- erated by the Port of Co- quille, on the Coquille River, and the cost of operation was borne by them. The derrick removed sand, mud, snags, and pieces of piling from the channel.	Remarks. 1 A frame, formerly on boat, taken off. Used in connection with operation of pipe-line dredge Wankiarum; cost of op-er- ation included in cost of op-er- ation of dredge.

TABLE IX.—Report of operations of derrick boats for the calendar year ending Dec. 31, 1916—Continued.

1. Name, letter, or number	No. 1.	No. 2.	No. 3.	No. 4.
2. District	St. Louis, Mo.	Vicksburg, Miss.	Wheeling, W. Va.	First, Cincinnati, Ohio.
3. Where built	do.	Artadaphia, Ark.	Rebuilt, Dam No. 28, Ohio River.	Jeffersonville, Ind. and Dam No. 39, Ohio River.
4. When built	1904.	1910.	1914, rebuilt 1.	1915.
5. Builder	Sam'l. W. Coffin & Son.	United States.	United States.	Ed. J. Howard and U. S. Engineers.
6. Time to build	Not known.	About two months.	24 months.	4 months.
7. Material of hull	Wood.	Wood.	Wood.	Steel.
8. Cost of hull	\$1,500.	Not known.	\$7,988.13.	\$5,500.
9. Cost of machinery	\$2,500.	do.	\$1,148.35.	\$7,944.96.
10. Total cost	\$4,000.	do.	\$9,106.48.	\$13,444.96.
11. Present value	\$1,700.	\$1,500.	\$6,000.	\$2,500.
12. Length	66 feet.	65 feet over all.	75 feet.	80 feet.
13. Beam	20 feet.	24 feet.	35 feet.	22 feet.
14. Depth	3 feet 14 inches.	2 feet.	4 feet 1 inch.	5 feet.
15. Draft forward	1 foot.	1 foot 4 inches.	2 feet 7 inches.	1 foot 4 inches.
16. Draft aft	1 foot 7 inches.	1 foot 4 inches.	2 feet 8 inches.	1 foot 2 inches.
17. Displacement	75 tons.	54.17 long tons.	170 tons.	2 feet 6 inches.
18. Mast:				76 tons.
(a) Height	45 feet.	None.	34 feet.	28 feet.
(b) Dimensions	Butt 12 inches square; top, 10 inches diameter.		14 by 14 inches.	11½ by 13½ inches.
19. Boom:				
(a) Length	62 feet 2 inches.		75 feet.	50 feet.
(b) Dimensions	Butt 10 inches square; top, 10 inches diameter.		14 by 14 inches.	Truss, 2 pieces, 5½ by 11½ inches.
(c) How braced			4 hog rods, 2 spiders.	
(d) Capacity in tons	2.		10.	10.
20. Bull-wheel diameter	None.		30 feet.	13 feet.
21. Bucket:				
(a) Type	do.	None.	Clamshell and orange peel.	Clamshell and orange peel.
(b) Capacity			1½ cubic yards.	¾ yard each.
(c) Hoisting engine	Crooke's.	None.	Lagerwood.	American Holst & Derrick Co.
(d) Number of drums	2.		3.	2.
(e) Dimensions of cylinders	7½ by 11 inches.		10 by 12 inches.	6½ by 10 inches.
(f) Diameter of rope	1-inch wire.		1-inch.	1 inch.
(g) Make	None.	2 Providence capstans.	American.	American.
(h) Number of drums		1.		2.
(i) Dimensions of cylinders		6 by 6 inches and 6 by 8 inches.	7 by 8 inches.	8 by 7 inches.
(j) Diameter of rope		1½ and 2 inch manilla.	1 inch.	1 inch.
(k) Make				Geared to hoisting engine.

Digitized by Google

TABLE IX.—Report of operations of derrick boats for the calendar year ending Dec 31, 1916—Continued.

1. Name, letter, or number.	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6, M. R.
2. District.	Detroit, Mich.	Mississippi River, first and second districts, Memphis, Tenn.	Nashville, Tenn.	New Orleans (fourth Mississippi River).	Pittsburgh, Pa.	
3. Where built.	Green Bay, Wis.	Memphis, Tenn.	Look 3, Cumberland River.	New Orleans, La.	Look 4, Pa.	
4. When built.	1913.	1905.	1909.	1913.	1905.	
5. Builder.	Hartman-Grelling Co.	United States.	U. S. Engineer Department.	U. S. Engineers.	United States.	
6. Time to build.	4 months.	2 months.	2 months.	3 months.	Wood.	
7. Material of hull.	Steel.	Wood.	Wood.	Chestnut wood.	Wood.	
8. Cost of hull.	\$25,170.	\$2,936.	\$3,507.	\$3,507.	\$2,319.50.	
9. Cost of machinery.	\$25,170.	Old equipment used.	\$2,971.	\$2,971.	\$3,500.	
10. Total cost.	\$21,017.	\$2,656.	\$5,507.	\$5,507.	\$1,100.	
11. Present value.	\$21,017.	\$5,153.	\$1,192.	\$5,071.	70 feet 7 inches.	
12. Length.	52 feet.	75 feet.	87 feet 6 inches.	100 feet.	20 feet 7 inches (over spud 28 feet 3 inches).	
13. Beam.	42 feet.	30 feet.	33 feet 4 inches.	30 feet.	4 feet.	
14. Depth.	12 feet.	5 feet.	4 feet 6 inches.	4 feet 9 inches.	2 feet.	
15. Draft forward.	4 feet 10 inches.	11 inches.	1 foot.	1 foot 5 inches.	1 foot 8 inches.	
16. Draft aft.	3 feet 2 inches.	11 inches.	1 foot 2 inches.	1 foot 4 inches.	90 tons.	
17. Displacement.	236 tons.	63 tons.	144 tons.	103 tons.	33 feet.	
18. Mast:					16 by 16 inches.	
(a) Height.	31 feet above deck.	30 feet.	"A" frame; no mast.	{40 feet.	83 feet.	
(b) Dimensions.	Truss.	13-inch channels, latticed, 14 inches outside.		{14 by 14 inches.	14 by 14 inches.	
19. Boom:					2 hog rods on bottom, 1 on each side.	
(a) Length.		75 feet.	67 feet.	75 feet.	5.	
(b) Dimensions.		30 inches square at middle.	12 by 12 inches.	12 by 12 inches.	12 feet.	
(c) How braced.		Lattice.	None.	4 truss rods.	No regular bucket.	
(d) Capacity in tons.		7.	5.	10 tons.	Doubt's controllable bottom-dump concrete bucket.	
20. Bucket:		None.	12 feet.	16 tons.	1 cubic yard.	
(a) Type.		do.	Clam shell and orange peel.		Williamson Bros.	
(b) Capacity.			4 yard each.		Thos. Carlin's Sons.	
22. Hoisting engine:					3.	
(a) Make.	Clyde Engine Works, Duluth, Minn.	Lidgerwood.	American Hoist & Derrick Co.		8 1/2-inch diameter by 11-inch stroke.	
(b) Number of drums.	2.	2.	3.	2.	1-inch wire.	
(c) Dimensions of cylinders.	7 by 10 inches.	12 by 14 inches.	7 by 13 inches.	8 1/2 by 10 inches.	1-inch steel.	
(d) Diameter of rope.	3/4 inch.	1/2-inch steel cable.	1/2 inch.	1-inch.		

Digitized by Google

TABLE IX.—Report of operations of derrick boats for the calendar year ending Dec. 31, 1916—Continued.

No. 1.	No. 2.	No. 3.	No. 4.	No. 4.	No. 4.
1. Name, letter, or number.	Second Portland, Ore. Portland, Ore.	Wheeling, W. Va. Dam No. 28, Ohio River	Chattanooga, Tenn. Knoxville, Tenn.	First Cincinnati, Ohio. Jeffersonville, Ind., and Dam No. 28, Ohio River.	Second Cincinnati, Ohio. Hull at Nashville, Tenn.
2. District.	1913.	1914.	1896.	1915.	1915.
3. Where built.	Chas. Nelson.	United States.	U. S. Engineer Department.	Ed J. Howard and U. S. Engineers.	Nashville Bridge Co.
4. When built.	8 months.	24 months.	Wood.	4 months.	Unknown.
5. Builder.	Ward.	Ward.	Steel.	Steel.	Steel.
6. Time to build.	\$1,078.	\$2,114.97 (including derrick and cabin).	\$1,200.	\$4,500.	\$4,500.
7. Materials of hull.	\$1,028.	\$2,114.97.	\$2,135.	\$7,005.92.	\$5,221.21.
8. Cost of hull.	\$2,706.	\$1,028.61.	\$5,235.	\$13,105.86.	\$11,121.21.
9. Cost of machinery.	\$1,028.	\$7,000.	\$849.	\$1,000.	\$4,000.
10. Total cost.	\$2,706.	\$2,114.97.	\$849.	\$1,000.	\$4,000.
11. Present value.	\$1,028.	\$7,000.	\$849.	\$1,000.	\$4,000.
12. Length.	22 feet.	75 feet.	80 feet.	70 feet.	70 feet.
13. Beam.	22 feet 6 inches.	23 feet.	33 feet 7 inches.	32 feet.	32 feet.
14. Depth.	2 feet 6 inches.	2 feet 7 inches.	3 feet 2 inches.	9 feet.	5 feet.
15. Draft forward.	2 feet 10 inches.	2 feet 6 inches.	1 foot.	2 feet 6 inches.	2 feet 4 inches.
16. Draft aft.	1 foot 3 inches.	2 feet 8 inches.	1 foot.	2 feet.	1 foot 10 inches.
17. Displacement.	42 tons.	140 tons.	64 long tons.	107.10 tons.	107 tons.
18. Mast:					
(a) Height.	No mast, "A" frame.	33 feet.	30 feet.	35 feet.	27 feet 10 inches.
(b) Dimensions.	20 feet high.	14 by 14 inches.	12 by 12 inches.	18 by 18 inches.	14 by 14 inch top; 14 by 22 inch base.
19. Boom:					
(a) Length.	None.	75 feet.	44 feet 4 inches.	70 feet.	70 feet.
(b) Dimensions.		14 by 14 inches.	12 by 12 inches.	16 by 16 inches.	14 by 14 inches.
(c) How braced.		4 hog rods and two spiders.	10.	Hog rods.	Four 1-inch wire rope.
(d) Capacity in tons.		15.	10.	12.	10.
20. Bull-wheel diameter.	None.	20 feet.	9 feet 7 inches.	16 feet.	18 feet.
21. Bucket:					
(a) Type.	do.	Clamshell or orange peel.	Clamshell.	Clamshell.	Clamshell.
(b) Capacity.		14 cubic yards.	1 cubic yard.	1 yard.	14 tons.
22. Hoisting engine:					
(a) Make.	Mundy.	Lambert Heating Engine Co.	Lidgerwood.	Lidgerwood.	J. S. Mundy.
(b) Number of drums.	2.	3.	Three 16 by 18 inches.	3.	3.
(c) Dimensions of cylinders.	74 by 12 inches.	104 by 12 inches.	7 by 10 inches.	10 by 12 inches.	10 by 12 inches.
(d) Diameter of rope.	1 inch.	1 inch.	1 inch.	1 inch.	1 inch.
23. Swinging engine:					
(a) Make.	None.	American Holst & Der- rick Co.	Lidgerwood.	American.	J. S. Mundy.
(b) Number of drums.		1.	2.	1.	1.
(c) Dimensions of cylinders.		7 by 8 inches.	6 by 6 inches.	5 by 7 inches.	5 by 8 inches.
(d) Diameter of rope.		1 inch.	1 inch.	1 inch.	1 inch.

FLOATING PLANT.

4295

24. Boiler:					
(a) Height or length	96 inches high	8 feet 6 inches high, 13 feet 6 inches long	101 inches	150 inches	17 feet.
(b) Diameter	42 inches	4 feet 2 inches	42 inches	72 inches	54 inches
(c) Hoisting surface	260 square feet	1,008 square feet	283.45 square feet	545 square feet	732 square feet
(d) Working pressure	100 pounds	100 pounds	125 pounds	125 pounds	130 pounds
OPERATING COST.					
25. Pay roll	(1)	\$2,794.27	\$283.89	1 \$5.99	\$1,285.09
26. Supplies	(1)	1,080.95	149.05	449.25	68.25
27. Repairs:					
(a) Hull	(1)	772.94	6.68		67.60
(b) Machinery	(1)	936.06	85.20		2,714.34
(c) Miscellaneous	(1)	321.87	1,471.98	1,078.79	95.55
28. Miscellaneous	(1)				
29. Total cost	(1)	\$5,906.09	\$606.80	\$1,533.52	\$4,228.74
30. Number of men in crew	3:1 man for each of 3 shifts		2	2	2
31. Number of days under way	237		53	309	238
32. Work done during year and where operated	(1)			(1)	Kentucky River, Ky.
	Remarks.	Remarks.	Remarks.	Remarks.	Remarks.
	1 Used in connection with operation of pipe-line dredge. Work done in cost of operation included in cost of operation of dredge.	Handling sand and gravel for concrete; aiding in cofferdam construction; banking and filling cofferdam; coal-ing plant; unloading from construction materials from flats and barges; removing plant and materials from cofferdams after completion of permanent work and before high water, all in connection with construction of Lock and Dam No. 22, Ohio River.	Operated in connection with work on French Broad River and at Coulter Island. Shovel, Tennessee River, handled 6,875 cubic yards material. Hull now being reconstructed at Chattanooga, Tenn. 1 Includes towboat operations and Nashville office charges.	1 Per shift. 2 Filling, banking, and removing cofferdams and handling materials at Lock and Dam No. 30, Ohio River.	Work done: Assisted in repair work at the various locks and dams; removed debris from lock chambers and approaches and miscellaneous work. Cost of machinery includes construction of new steel deck truck not yet installed and transfer of machinery from old to new steel hull. This work is not yet completed.

TABLE IX.—Report of operations of derrick boats for the calendar year ending Dec. 31, 1916—Continued.

No. 1.	Name, letter, or number.	No. 4.	No. 4.	No. 4.	No. 4. G. and B.	No. 4.
2.	District.	Galveston, Tex.	Little Rock, Ark.	Los Angeles, Cal.	Louisville, Ky.	Nashville, Tenn.
3.	Where built.	do.	Batesville, Ark.	Los Angeles district, Cal.	Idem.	Lock A, Cumberland River.
4.	When built.	1902.	1916.	1904.	1914.	1912.
5.	Builder.	Wm. More.	U. S. Engineers.	U. S. Engineer Department.	Ed. J. Howard (hull).	U. S. Engineer Department.
6.	Time to build.	6 months.	3 months.	Not known.	Hull, 97 days; cabin, etc., 10 days.	2 months.
7.	Material of hull.	Wood.	Crested pine.	Wood.	Steel.	Wood.
8.	Cost of hull.	\$2,750.	\$4,020.25.	\$377.70.	\$4,225.	\$4,419.98.
9.	Cost of machinery.		\$1,969.40.		\$4,055.	\$2,947.58.
10.	Total cost.				\$10,284.13.	\$6,267.56.
11.	Present value.	\$4,500.	\$5,998.74.	\$377.70.	\$1,011.13.	\$4,463.
12.	Length.	70 feet.	67 feet 3 inches.	29 feet 9 inches.	\$10,200.	70 feet.
13.	Beam.	20 feet 1 inch.	30 feet.	10 feet 7 inches.	80 feet 8 inches.	33 feet.
14.	Depth.	2 feet 10 inches.	4 feet.	3 feet 10 inches.	26 feet 8 inches.	4 feet 7 inches.
15.	Draft forward.	2 feet 8 inches.	1 to 11 inch's.	8 inches.	3 feet.	1 foot 1 inch.
16.	Draft aft.	2 feet 8 inches.	1 foot 4 inches.	10 inches.	2 ft. 2 inches.	1 foot 1 inch.
17.	Displacement.	140 tons.	82 tons.	9 tons.	1 foot 10 inches.	1 foot 24 inches.
18.	Mast.				120.4 long tons.	54.3 tons.
	(a) Height.		41 feet 8 inches.	24 feet.	33 feet 10 inches.	33 feet.
	(b) Dimensions.		14 by 14 inches.	10 by 10 inches.	70p, 124 by 124 inches; mid-dle 35 by 25 inches; bot-tom, 144 by 144 inches.	14 by 14 inches.
19.	Booms:					
	(a) Length.	44 feet.	70 feet.	None.	59 feet 104 inches.	50 feet.
	(b) Dimensions.	14 by 14 inches.	14 by 14 inches.	14 by 14 inches.	14 by 14 inches.	12 by 12 inches.
	(c) How braced.	Sheer logs and "A" frame.	With 44-inch cables on cor-ners of boom. Diamond brace.	Four 1-inch hog chains.	Four 1-inch hog chains.	4 truss rods.
20.	Capacity, in tons.	10.	3.	2 (hand winch).	9.	5.
21.	Bucinet:	None.	10 feet.	None.	15 feet 6 inches.	12 feet.
	(a) Type.	do.	Grapple.	do.	Clamshell.	Hercules clamshell.
	(b) Capacity.	do.	1 cubic yard.	do.	1 cubic yard.	1 cubic yard.
22.	Hoisting engine:	Lidgerwood.	American Hoist & Derrick (C).	Hand winch, 6-inch drums.	Mundy.	Clyde Iron Works, Duluth.
	(a) Make.					3 Minn.
	(b) Number of drums.	2.	2 hoisting.	1.	3.	84 by 10 inches.
	(c) Dimensions of cylinders.	9 by 10 inches.	81-inch bore, 10-inch stroke.		84 by 13 inches.	
	(d) Diameter of rope.	14-inch wire.	14-inch.	2 double blocks, falls 11-inch rope.	14-inch.	14-inch.

23. Swinging engine: (a) Make.....	None.....	American Holst & Derrick Co. 2 swinging..... 6-inch bore, 7-inch stroke.....	None.....	Mundy.....	Clyde Iron Works. 2..... 4 by 4 inches. 1 inch. Length, 16 feet. 34 feet. 322 square feet. 120 pounds.
24. Boiler: (a) Height or length..... (b) Diameter..... (c) Heating surface..... (d) Working pressure.....	8 feet 6 inches. 4 feet. 450 square feet. 110 pounds per square inch.	7 feet 11 inches. 43 inches. 313 square feet. 123 pounds.	None.....	1..... 6 by 8 inches. 1 inch. 9 feet 11 inches. 3 feet 10 inches. 126 pounds.	
25. Pay roll.....		\$995.45	(1)	\$2,660.67	\$649.76
26. Supplies.....		137.96		289.37	197.57
27. Repairs: (a) Hull..... (b) Machinery..... (c) Miscellaneous.....	\$768.20 31.00	20.00		135.39 325.36 1.23	90.53
28. Total cost.....	\$797.20			\$3,382.10	\$683.46
29. Number of men in crew.....	No regular crew.			4.....	3.....
30. Number of days under steam.....	No record.	190.....		313.....	145.....
31. Work done during year and where operated.	(1).....	Locks and dams, upper White River, Ark.		See Remarks.....	(1).....
	Remarks. 1 Derrick boat only used occasionally by employees of Fort Point for lifting heavy articles.	Remarks. Repairing breaks in Dam No. 2 and rebuilding abutment protection and lower land crib, Lock No. 1.	Remarks. 1 Out of commission entire year.	Remarks. Assisted in repair work at the several locks and dams on Green and Barren Rivers, Ky., removed 9,535 cubic yards of deposit from chambers and approaches to Locks Nos. 2 and 3, Green River, and assisted in the construction of the navigable pass at Dam No. 43, Ohio River. 1 Cabin and machinery installed by the United States.	Remarks. 1 Used in handling material in connection with construction of dam, toe wall, etc., Lock B.

TABLE IX.—*Report of operations of derrick boats for the calendar year ending Dec. 31, 1916.*

No. 1.	Name, letter, or number.	No. 4.	No. 5.	No. 6.	No. 6.
2.	District.	Pittsburgh, Pa.	Chattanooga, Tenn.	Second, Cincinnati, Ohio.	Los Angeles, Cal.
3.	Where built.	Lock 4, Pa.	Muscle Shoals Canal, Ala.	Frankfort, Ky.	Los Angeles Harbor, Cal.
4.	When built.	1916.	1908; rebuilt 1918.	1913.	1912.
5.	Builder.	United States.	U. S. Engineer Department.	De Moines Bridge & Iron Works.	U. S. Engineer Department.
6.	Time to build.	6 months.	3 months.	4 months.	About 5 weeks.
7.	Material of hull.	Wood.	Wood.	Steel.	Wood.
8.	Cost of hull.	\$4,581.	\$1,730.	\$4,398.	\$247,552.
9.	Cost of machinery.	\$2,580.	\$1,678.	\$2,000.	\$657.
10.	Total cost.	\$7,161.	\$3,408.	\$7,500.	\$1,354.02.
11.	Present value.	\$7,061.	\$3,322.	\$5,700.	\$1,460.
12.	Length.	70 feet.	30 feet.	65 feet.	40 feet.
13.	Beam.	32 feet.	22 feet 6 inches.	34 feet.	18 feet.
14.	Depth.	3 feet 8 inches.	2 feet 10 inches.	4 feet.	3 feet 10 inches.
15.	Draft forward.	1 foot 4 inches.	1 foot 6 inches.	1 foot 4 inches.	11 inches.
16.	Draft aft.	1 foot 6 inches.	1 foot 3 inches.	1 foot 3 inches.	11 inches.
17.	Displacement.	101 tons.	160 long tons.	65 long tons.	19 tons.
18.	Mast:				
	(a) Height.	37 feet.	40 feet.	33 feet.	"A" frame: 21 feet.
	(b) Dimensions.	14 by 14 inches.	16 by 16 inches.	14 by 14 inches.	10 by 10 inches.
19.	Boom:				
	(a) Length.	65 feet.	65 feet.	64 feet.	None.
	(b) Dimensions.	14 by 14 inches.	14 by 16 inches.	14 by 14 inches.	
	(c) How braced.	With hog chains four ways.	Not braced.	Not braced.	
	(d) Capacity in tons.	5 tons.	10.	5 tons.	
20.	Bull-wheel diameter.	14 feet.	16 feet.	14 feet.	
21.	Bucket:				
	(a) Type.	Clamshell or orange-peel.	Orange-peel.	Clamshell and orange-peel.	None.
	(b) Capacity.	1 yard.	1 cubic yard.	1 cubic yard.	
	(c) Make.	American Hoist & Derrick Co.	American Hoist & Derrick Co.	J. S. Mundy.	6 horsepower union gasoline.
22.	Holding engine:				
	(a) Make.	3.	3.	3.	1 drum, 2 winch heads.
	(b) Number of drums.	84 by 10 inches.	7 by 10 inches.	7-inch diameter, 12-inch stroke.	84 by 6 inches.
	(c) Dimensions of cylinders.	4-inch wire.	4-inch.	4-inch.	14 inches.
23.	Swinging engine:				
	(a) Make.	American Hoist & Derrick Co.	American Hoist & Derrick Co.	J. S. Mundy.	None.
	(b) Number of drums.	1.	1.	1.	
	(c) Dimensions of cylinders.	4 by 5 inches.	4 by 5 inches.	6 by 5 inches.	
	(d) Diameter of rope.	4-inch wire.	4-inch.	4-inch.	

24. Boiler: (a) Height or length. (b) Diameter. (c) Heating surface. (d) Working pressure.	8 feet 6 inches high. 46 inches. 268 square feet. 125 pounds.	98 inches high. 42 inches. 268 square feet. 100 pounds.	101 inches. 40 inches. 270 square feet. 125 pounds.	8 feet high. 42 inches. 248 square feet. 125 pounds.	Do.
OPERATING COST.					
25. Pay roll.....			\$1,538.85	\$1,413.33	(1)
26. Repairs.....			1,042.40	68.98	
27. Fuel.....			459.98	98.00	
(b) Hull.....			764.19	2,253.46	
(b) Machinery.....			12,094.71	85.55	
28. Miscellaneous.....					
29. Total cost.....			\$1,900.11	\$3,927.52	
30. Number of men in crew.....			2	2	
31. Number of days under way.....			213	298	
32. Work done during year and where operated.	Commissioned January, 1917.			Kentucky River, Ky.	Remarks. 1 Out of commission entire year.
		Remarks. 1 A-frame, formerly on boat, taken off. 2 Used in connection with operation of pipe-line dredge Multnomah; cost of operation included in cost of operation of dredge.	Remarks. Operated in connection with work at Rogers Island and Tuscumbia Bar, Tennessee River, handling 3,182 cubic yards of excavated material. 1 Includes pro rata of tow-boat and launch operations and repairs, Nashville office expenses and repairs to barges, scows, and quarter-boats.	Remarks. Work done: Assisted in repair work at the various locks and dams, removed deposits from lock chambers and approaches and general miscellaneous work. Cost of machinery includes construction of new steel derrick, not yet installed on boat.	

TABLE IX.—Report of operations of derrick boats for the calendar year ending Dec. 31, 1916—Continued.

No. 1. Name, letter, or number.	No. 2.	No. 3.	No. 4. M. R.	No. 5.	No. 6.
2. District.....	Manila.....	Nashville, Tenn.....	Pittsburgh, Pa.....	Second Portland, Ore.....	Chattanooga, Tenn.....
3. Where built.....	Hilo, P. I.....	Lock A, Cumberland River.....	Lock 4, Pennsylvania.....	Portland, Ore.....	Knoxville, Tenn.....
4. When built.....	1905.....	1913.....	1915.....	1915.....	1908; rebuilt 1912.
5. Builder.....	J. G. White & Co.....	U. S. Engineer Department.....	United States.....	U. S. Engineer Department.....	U. S. Engineer Department.....
6. Time to build.....	Unknown.....	2 months.....	4 months.....	3 months.....	58 days.....
7. Material of hull.....	Wood.....	Wood.....	Wood.....	Wood.....	Wood.....
8. Cost of hull.....	\$3,000 (purchase price).....	\$4,419.96.....	\$5,604.....	\$3,600.....	\$3,469.18.....
9. Cost of machinery.....	\$2,947.90.....	\$2,580.....	\$2,415 (second hand).....	\$2,400.....	\$2,400 (approximate).....
10. Total cost.....	\$6,275.06.....	\$7,267.86.....	\$8,154.....	\$6,000.....	\$6,069.18.....
11. Present value.....	\$2,000.....	\$4,120.....	\$7,775.....	\$7,600.....	\$3,864.....
12. Length.....	75 feet 6 inches.....	90 feet.....	70 feet.....	90 feet.....	80 feet.....
13. Beam.....	25 feet 6 inches.....	32 feet.....	32 feet.....	30 feet.....	30 feet.....
14. Depth.....	7 feet.....	4 feet 7 inches.....	3 feet 8 inches.....	6 feet 4 inches.....	4 feet.....
15. Draft forward.....	2 feet 4 inches.....	1 foot 1 inch.....	1 foot 6 inches.....	1 foot 8 inches.....	1 foot 6 inches.....
16. Draft aft.....	3 feet 7 inches.....	1 foot 3 inches.....	1 foot 4 inches.....	1 foot 10 inches.....	1 foot.....
17. Displacement.....	166 tons.....	43.3 tons.....	101 tons.....	112 tons.....	76 long tons.....
18. Mast: (a) Height..... (b) Dimensions.....	30 feet 8 inches..... 11 by 14 inches.....	33 feet..... 14 by 14 inches.....	37 feet..... 14 by 14 inches.....	40 feet..... 16 by 16 inches.....	36 feet..... 12 by 12 inches.....
19. Boom: (a) Length..... (b) Dimensions..... (c) How braced.....	47 feet 4 inches..... 12 by 12 inches..... Braced with 4-inch angles, clamps, and 1-inch tie rods	50 feet..... 12 by 12 inches..... 4 truss rods	65 feet..... 14 by 14 inches..... With hog chains four way.....	70 feet..... 14 by 14 inches..... 1-inch hog rods on four sides.....	65 feet..... 12 by 12 inches..... Trusses.....
20. Built-wheel diameter.....	6 tons of 2,000 pounds.....	5.....	5.....	10.....	25.....
21. Bucket: (a) Capacity..... (b) Type..... (c) Capacity..... (d) Make.....	Orange peel..... 1 cubic yard..... Lidgerwood No. 30092.....	Hayward clamshell..... 1 cubic yard..... Clyde Iron Works.....	Clamshell or orange peel..... 1 yard..... American Hoist & Derrick Co.....	Williams's grab..... 1 cubic yard..... Washington Iron Works.....	1 orange peel and 1 clamshell; Orange peel 1 cubic yard, clamshell 1 cubic yard. American Hoist & Derrick Co.....
22. Hoisting engine: (a) Number of drums..... (c) Dimensions of cylinders..... (d) Diameter of rope..... (e) Make.....	3..... 8 by 10 inches..... 3, inch all lines..... No. 5 Cavell patent.....	3..... 81 by 10 inches..... 1 inch..... Clyde Iron Works.....	3..... 81 by 10 inches..... 1 inch wire..... American Hoist & Derrick Co.....	3..... 8 by 10 inches..... 1 inch..... Part of hoisting rig.....	3..... 7 by 10 inches..... 1 inch..... American Hoist & Derrick Co.....
23. Springing engine: (a) Number of drums..... (c) Dimensions of cylinders..... (d) Diameter of rope..... (e) Make.....	2..... 1 inch on swing only.....	2..... 4 by 6 inches..... 1 inch.....	1..... 4 by 5 inches..... 1-inch wire.....	1..... 4 by 5 inches..... 1 inch.....	1..... 4 by 5 inches..... 1 inch.....

24. Boiler: (a) Height or length. (b) Diameter. (c) Heating surface. (d) Working pressure.	Height, 7 feet 4 1/2 inches, 3001.2. 3 feet 8 inches 220 square feet. 100 pounds.	10 feet. 3 feet 6 inches 322 square feet. 125 pounds.	9 feet 6 inches high. 46 inches. 393 square feet. 175 pounds.	106 inches high. 48 inches. 393 square feet. 175 pounds.	Length, 17 feet 4 inches: height, 5 feet 4 inches. 4 feet 1 inch. 324 square feet. 135 pounds.
25. Pay roll.....	\$492.72	\$703.84	\$1,125.83	\$3,270.55	\$1,746.57
26. Supplies.....	106.23	524.36	204.50	485.87	1,463.47
27. Repairs: (a) Hull.....	1,750.35	25.00	25.00	151.78	421.38
(b) Machinery.....	1,453.20	68.31	68.31	1,128.53	241.41
28. Miscellaneous.....	159.12	25.00			1,335.29
29. Total cost.....	\$4,250.03	\$1,023.20	\$1,423.39	\$5,086.73	\$4,228.12
30. Number of men in crew.	5.	3.	4 to 6 men per shift.	3.	5.
31. Number of days under steam.	280.	151.	328.	229.	130.
32. Work done during year and where operated.		(1)	(1)	(1)	
	Work done consists of dismantling wharf at Fort Wint, repairing wharf at Fort Hughes, and rebuilding wharf at Engineer Department Landing, Manila.	Handling material in construction of toe wall, etc., Lock B, Cumberland River.	Assisted in rebuilding Lock and Dam No. 6, Monongahela River, between Jan. 1 and July 19; after that date at reconstruction of Dam No. 11, Monongahela River, handling steel piles and timber for cofferdam, and furnishing compressed air for drills, etc.	Includes \$2,385 cost of upper works. Dredged 200 cubic yards of material from the canal of the locks at Oregon City, Oreg., unloaded gravel, and cement, handled, and placed cofferdam sections, handled timbers, piling, lumber, and other material, all in the work of improving Willamette River, Oreg., for Willamette Falls.	Operated in connection with work at Williams and Lyons Shoals, Tennessee River. Was operated in connection with drill unit No. 1-B, and greater part of operation costs shown above are included in drill unit No. 1-B. While used as derrick boat it handled 1,158 cubic yards of gravel. Includes pro rata of tow-boat and launch operations and repairs, Nashville and field office expenses, and repairs to barges, scows, and quarterboats.

TABLE IX.—Report of operations of derrick boats for the calendar year ending Dec. 31, 1916—Continued.

No. 1.	No. 7.	No. 7.	No. 7, L. E.	No. 8.	No. 8.
1. Name, letter, or number.					
2. District.	Chattanooga, Tenn.	Duluth, Minn.	Wheeling, W. Va.	Chattanooga, Tenn.	Duluth, Minn.
3. Where built.	Muscle Shoals Canal, Ala.	Duluth-Superior Harbor.	Dam No. 18, Ohio River.	do.	Superior Entry, Wis.
4. When built.	1909.	1907.	1913.	1915.	1907.
5. Builder.	U. S. Engineer Department.	United States.	United States.	U. S. Engineer Department.	United States.
6. Time to build.	3 months.	6 months.	About 60 days.	Wood.	6 months.
7. Material of hull.	Wood.	Washington fir.	Oak and fir timber.	Wood.	Wood.
8. Cost of hull.	\$2,892.31.	\$6,600.	\$2,816.17.	\$3,583.72.	\$3,000.
9. Cost of machinery.	\$2,515.35.	\$5,307.	\$1,983.39.	\$2,818.1.	\$1,108.49.
10. Total cost.	\$5,407.56.	\$11,907.	\$4,910.66.	\$6,401.72.	\$4,108.49.
11. Present value.	\$3,643.	\$6,787.	\$3,500.	\$5,804.	\$2,800.
12. Length.	80 feet 6 inches.	102 feet 6 inches.	70 feet.	80 feet 6 inches.	70 feet.
13. Beam.	30 feet.	32 feet.	22 feet.	30 feet.	20 feet.
14. Depth.	4 feet 6 inches.	7 feet 10 inches.	4 feet 10 inches.	4 feet 5 inches.	5 feet 6 inches.
15. Draft forward.	1 foot 11 inches.	1 foot 6 inches.	2 feet.	1 foot 9 inches.	6 inches.
16. Draft aft.	1 foot 10 inches.	4 feet.	2 feet.	1 foot 9 inches.	1 foot 6 inches.
17. Displacement.	85 long tons.	184 long tons.	93 tons.	115 long tons.	40 long tons.
18. Mast.					
(a) Height.	29 feet 4 inches.	20 feet.	26 feet.	30 feet 10 inches.	29 feet.
(b) Bottom.	14 by 14 inches.	16 by 16 inches.	14 by 14 inches.	114 by 144 inches.	14 by 14 inches.
(c) Length.	58 feet 4 inches.	54 feet.	55 feet.	62 feet.	40 feet.
(d) Dimensions.	20-inch round pole.	14 by 14 inches.	14 by 14 inches.	17-inch round pole.	14 by 16 inches and 12 by 12 inches.
(e) How braced.	No braces.	Slide guy cables.	Not braced.	Not braced.	Mast braced by 4 stiff legs.
(f) Capacity in tons.	10.	15.	5.	10.	10.
20. Fly-wheel diameter.	12 feet.	12 feet.	12 feet.	12 feet.	8 feet.
21. Bucket.	Chamshell.	5-toothed grapple.	Chamshell and orange-peel.	Orange-peel.	None.
(a) Type.	1 cubic yard.	25 tons.	1 cubic yard.	1 cubic yard.	Do.
22. Hoisting engine.	Lidgerwood.	Lidgerwood.	Pittsburgh Industrial Iron Works.	Lidgerwood.	Lambert.
(a) Make.					
(b) Number of drums.	3.	3.	3.	3.	2.
(c) Dimensions of cylinders.	84 by 10 inches.	9 by 10 inches.	10 by 12 inches.	74 by 10 inches.	7 by 10 inches, 20 horsepower.
(d) Diameter of rope.	1 inch.	1 and 1 inch.	1 inch.	1 inch.	1 and 1 inch wire.
(e) Make.	American Hoist & Derrick Co.	Superior Iron Works.	Dake Machine Co.	Mundy.	Dake.
(b) Number of drums.	1.	1.	1.	1.	1.
(c) Dimensions of cylinders.	4 by 5 inches.	64 by 64 inches.	1.	44 by 6 inches.	64 by 5 inches, double.
(d) Diameter of rope.	1 inch.	1-inch wire.	1-inch wire.	1 inch.	1 inch wire.

24. Boller.	7 feet 6 inches 3 feet 8 inches (a) Diameter (b) Height or length (c) Working surface (d) Working pressure	102 inches 60 inches 384 square feet 125 pounds	8 feet 60 inches 610 square feet 100 pounds per square inch	7 feet 40 inches 948 square feet 125 pounds	90 inches 38 inches 227 square feet 80 pounds
OPERATING COST.					
25. Pay roll	\$2,312.19	\$3,738.65	\$948.00	\$241.22	\$950.96
26. Supplies	1,148.68	108.49	97.66	609.66	58.92
27. Repairs	998.99	131.46	128.63		34.30
(a) Hull	394.06	223.35	221.08		54.16
(b) Machinery			62.36	1,645.92	244.31
28. Miscellaneous	1,364.11	1,092.60		1,903.06	
29. Total cost		\$4,986.55		\$4,009.29	\$1,312.55
30. Number of men in crew	8	7	2	4	5
31. Number of days under steam	166	222	168	104	224
32. Work done during year and where operated		Towing timber, Duluth to Houghton.	(3)		Construction of mooring pier; repairs.
	Remarks.	Remarks.	Remarks.	Remarks.	Remarks.
	Operated in connection with work at Washington, Hazlet, and Salt Creek Shoals, Tennessee River.	Construction mooring pier, Portage River Harbor of Refuge; constructing pile pier Fort Wing; riprap repairs Superior dairy piers.	Includes cabin. Includes \$201.10 for furnishings. Miscellaneous construction work at Dumas Nos. 16, 17, and 19, Ohio River.	Operated in connection with work at Salt Creek Shoals, Tennessee River. New hull built September, 1916, and cabin installed during 1916, and machinery overhauled and additional machinery installed. Includes pro rata of low-boast and launch operations and repairs, repairs to barges, scows, and quarter boats, and Nashville and field office expenses.	To revetments, piers, and breakwaters, Keweenaw Waterway, Mich.

TABLE IX.—Report of operations of derrick boats for the calendar year ending Dec. 31, 1916—Continued.

No. 9.	No. 10.	No. 11.	No. 12.	No. 13.
1. Name, letter, or number.				
2. District.	Chattanooga, Tenn.	Chattanooga, Tenn.	Chattanooga, Tenn.	Chattanooga, Tenn.
3. Where built.	Riverton, Ala.	New Orleans, La.	New Orleans, La.	Do.
4. When built.	1911.	1913.	1913.	1913.
5. Builder.	U. S. Engineer Department.	United States.	United States.	U. S. Engineer Department.
6. Time to build.	8 months.	Not known.	Not known.	34 months.
7. Material of hull.	Wood.	Crescoted wood.	Crescoted wood.	Wood.
8. Cost of hull.	\$5,352.71.	\$2,989.09.	\$2,984.09.	\$4,449.44.
9. Cost of machinery.	\$1,320.60.	\$5,558.04.	\$5,542.01.	\$3,427.10.
10. Total cost.	\$6,703.31.	\$8,547.13.	\$8,527.	\$7,876.53.
11. Present value.	\$3,394.	\$5,170.	\$5,537.	\$6,160.
12. Length.	30 feet.	30 feet.	30 feet.	30 feet.
13. Beam.	4 feet.	4 feet.	4 feet.	4 feet.
14. Depth.	4 feet 9 inches.	4 feet.	4 feet.	4 feet 6 inches.
15. Draft forward.	1 foot 9 inches.	1 foot 5 inches.	1 foot 5 inches.	30 feet 6 inches.
16. Draft aft.	1 foot 7 inches.	1 foot 5 inches.	1 foot 4 inches.	4 feet 6 inches.
17. Displacement.	100 long tons.	80 long tons.	85 long tons.	2 feet.
18. Mast:				
(a) Height.	40 feet.	40 feet.	40 feet.	32 feet 9 inches.
(b) Dimensions.	16 by 16 inches.	14 by 14 inches.	14 by 14 inches.	14 by 14 inches.
19. Boom:				
(a) Length.	60 feet.	65 feet.	60 feet.	62 feet.
(b) Dimensions.	14 by 14 inches.	12 by 14 inches.	14 by 14 inches.	12 by 12 inches.
(c) How braced.	A-frame and stiff legs.	Stiff legs.	Truss.	Iron truss.
(d) Capacity in tons.	10.	15.	15.	10.
20. Bull-wheel diameter.	14 feet.	16 feet.	16 feet.	10 feet 4 inches.
21. Bucket:				
(a) Type.	Orange peel.	Clamshell and 2-bladed orange peel.	Orange peel.	Orange peel.
(b) Capacity.	1 cubic yard.	1 cubic yard.	1 cubic yard.	1 cubic yard.
22. Hoisting engine:				
(a) Make.	American Hoist & Derrick Co.	Lidgerwood Manufacturing Co.	American Hoist & Derrick Co.	American Hoist & Derrick Co.
(b) Number of drums.	2.	3.	3.	3.
(c) Dimensions of cylinders.	7 by 10 inches.	7 by 10 inches.	84 by 10 inches.	9 by 10 inches.
(d) Diameter of rope.	1 inch.	1 inch.	1 inch.	1 inch.
23. Swinging engine:				
(a) Make.	Lidgerwood Manufacturing Co.	Lidgerwood Manufacturing Co.	Lidgerwood Manufacturing Co.	American Hoist & Derrick Co.
(b) Number of drums.	2.	2.	2.	1.
(c) Dimensions of cylinders.	5 by 7 inches.	5 by 6 inches.	4 by 6 inches.	4 by 5 inches.
(d) Diameter of rope.	1 inch.	1 inch.	1 inch.	1 inch.

24. Boiler:	Height or length.				90 inches.				7 feet.				
	(a) Diameter.	(b) Diameter.	(c) Heating surface.	(d) Working pressure.	43 inches.	43 inches.	350 square feet.	125 pounds.	3 feet 6 inches.	3 feet 6 inches.	350 square feet.	125 pounds.	
25. Pay roll.	\$1,211.00	\$1,594.50				\$2,673.48			\$2,592.50			\$1,242.42	
26. Supplies.	731.44	912.90				2,123.55			1,063.42			1,468.96	
27. Repairs:													
(a) Hull.	\$2.84	301.54				124.11			140.32			12.00	
(b) Machinery.	195.50	538.62				213.50			220.35			603.59	
28. Miscellaneous.	1,005.60	1,977.86				1,2,097.75			1,570.13			1,2,492.93	
29. Total cost.	\$3,176.40	\$5,555.43											\$5,870.90
30. Number of men in crew.	4.	3.				7.			5.			3.	
31. Number of days under steam.	21½.	27.				179.			231.			104.	
32. Work done during year and where operated.	Remarks.	Remarks.	Remarks.	Remarks.	Remarks.	Remarks.	Remarks.	Remarks.	Remarks.	Remarks.	Remarks.	Remarks.	Remarks.
	Operated in connection with work at Colbert Shoals and Canal, Elie Ben Shoals and River, Tennessee River. Handled 2,275 cubic yards of material. Includes pro rata part of boat and launch operation and repairs, field and Nashville office charges, and repairs of barges, scows, and quarterboats.	Operated in connection with work at Koger Island and Tusculum Bar, Tennessee River. Handled 6,420 cubic yards of material. Includes pro rata part of operations and repairs of towboats, launches, barges, scows, and quarterboats, and field and Nashville office charges.	Operated in connection with work at Williams, Lyons and Coulter Island Shoals, Tennessee River. Handled 15,029 cubic yards of material. Includes pro rata part of operations of towboats and launches, barges, scows, and quarterboats, and field and Nashville office charges.	Operated in connection with work at Williams, Lyons and Coulter Island Shoals, Tennessee River. Handled 10,266 cubic yards of rock and gravel. Includes pro rata part of the operations and repairs of towboats, launches, barges, scows, and quarterboats, and field and Nashville office charges.	Used at Williams and Lyons Shoals, Tennessee River. Handled 10,266 cubic yards of rock and gravel. Includes pro rata part of the operations and repairs of towboats, launches, barges, scows, and quarterboats, and field and Nashville office charges.	Operated in connection with work on French Broad River and at Coulter Island Shoals, Tennessee River. Handled 26,647 cubic yards of material. Includes pro rata part of the operations and repairs of towboats, barges, scows, and quarterboats, and field and Nashville office charges.							

TABLE IX.—Report of operations of derrick boats for the calendar year ending Dec. 31, 1916—Continued.

No. 14.	No. 15.	No. 16.	No. 16, Hudson River.	No. 18, Hudson River.
1. Name, letter, or number.				
2. District.	Chattanooga, Tenn.	Chattanooga, Tenn.	First, New York.	First, New York.
3. Where built.	1913.	New Orleans, La.	Albany, N. Y.	Albany, N. Y.
4. When built.	U. S. Engineer Department.	U. S. Engineer Department.	U. S. Engineer Department.	U. S. Engineer Department.
6. Builder.	44 months.	Unknown.	6 months.	Constructed intermittently.
7. Material of hull.	Wood.	Crescoted wood.	Wood.	Wood.
8. Cost of hull.	\$4,526.45.	\$4,520.51.	\$3,285.15.	\$840.
9. Cost of machinery.	\$3,344.98.	\$2,757.40.	\$8,174.95.	\$9,467.59.
10. Total cost.	\$7,871.43.	\$9,285.03.	\$11,400.10.	\$10,307.59.
11. Present value.	\$5,940.	\$6,760.	\$7,035.70.	\$2,550.1
12. Length.	80 feet.	90 feet.	80 feet.	84 feet.
13. Beam.	30 feet.	34 feet.	26 feet 6 inches.	27 feet 6 inches.
14. Depth.	4 feet.	4 feet 6 inches.	6 feet.	8 feet 6 inches.
15. Draft forward.	1 foot 6 inches.	2 feet.	1 foot 8 inches.	2 feet 6 inches.
16. Draft aft.	1 foot 4 inches.	1 foot 6 inches.	3 feet 9 inches.	4 feet.
17. Displacement.	83 long tons.	134 long tons.	170 tons.	300 tons.
18. Mast:				
(a) Height.	33 feet.	45 feet.	22 feet 6 inches.	35 feet.
(b) Dimensions.	14 by 14 inches.	18 by 16 inches.	14 by 14 inches.	12 by 18 inches, steel.
19. Boom:				
(a) Length.	65 feet.	65 feet.	50 feet.	72 feet.
(b) Dimensions.	12 by 12 inches.	14 by 16 inches.	14 by 14 inches.	12 by 14 inches.
(c) How braced.	Truss.	Truss rods.	Hog rods.	Hog rods.
(d) Capacity in tons.	15.	10.	10 to 15.	5.
20. Bull-wheel diameter.	14 feet.	16 feet.	14 feet.	12 feet.
21. Bucket:				
(a) Type.	Orange peel.	Orange peel.	Orange peel.	Orange peel and clamshell.
(b) Capacity.	1 cubic yard.	1 cubic yard.	1½ cubic yards.	1 cubic yard each.
22. Hoisting engine:				
(a) Make.	Lambert.	American Hoist & Derrick Co.	National.	Lidgerwood.
(b) Number of drums.	3.	3.	2.	2.
(c) Dimensions of cylinders.	84 by 12 inches.	84 by 10 inches.	9 by 12 inches.	84 by 10 inches.
(d) Diameter of rope.	1 inch.	1 inch.	1 and 1 inch wire rope.	1-inch wire rope.
26. Swinging engine:				
(a) Make.	Lidgerwood Manufacturing Co.	American Hoist & Derrick Co.	National.	Lidgerwood.
(b) Number of drums.	2.	1.	2.	2.
(c) Dimensions of cylinders.	4 by 6 inches.	4 by 6 inches.	5 by 8 inches.	5 by 6 inches.
(d) Diameter of rope.	1 inch.	1 inch.	1-inch wire rope.	1-inch wire rope.

24. Roller:

(a) Height or length.	8 feet 4 inches.	7 feet 9 inches.	112 inches.	10 feet.	10 feet.
(b) Diameter.	3 feet 11 inches.	42 inches.	40 inches.	4 feet 11 inches.	4 feet.
(c) Heating surface.	302 square feet.	401 square feet.	375 square feet.	903 square feet.	513 square feet.
(d) Working pressure	125 pounds.	125 pounds.	125 pounds.	100 pounds.	100 pounds.

OPERATING COST.

25. Pay roll.	\$2,740.02	\$1,377.97	\$1,190.85	\$2,918.23	\$2,648.96
26. Supplies.	2,018.73	768.15	1,027.35	4,953.30	857.63
27. Repairs:					
(a) Hull.	198.59	328.22	360.36	304.35	1.25
(b) Machinery.	408.79	447.45	757.24	1,922.66	378.06
28. Miscellaneous.	2,064.90	1,806.76	1,806.87		35.44
Total cost.	\$7,461.12	\$4,728.57	\$5,142.67	\$11,096.54	\$4,121.86
29. Number of men in crew.	180.	183.	230.	Under continuous steam.	201.
30. Number of days under steam.				Dredging rock at Harlem River.	
31. Work done during year and where operated.					

Remarks.	Remarks.	Remarks.	Remarks.
Used at Williams and Lyons Shoals, Tennessee River. Handled 6,330 cubic yards of rock and gravel. Includes pro rata part of the operations and repairs of towboats, launches, barges, scows, and quarterboats, and Nashville office charges.	Operated in connection with work at Big Bend, Bear Creek, Indian Creek Shoals, and Riverton Lock Approach. Includes pro rata part of operations of towboats and launches, barges, scows, and quarterboats, and Nashville office charges.	Operated in connection with work at Rogers Island and Tusculum Bar, Tennessee River. Handled 17,565 cubic yards of material. Includes pro rata part of the operations and repairs of towboats, launches, barges, scows, and quarterboats, and Nashville office charges.	Formerly concrete mixer. Concrete mixing machinery disposed of in 1915. Sold Sept. 19, 1916, to The Foundation Co., for \$2,550. Removing old State Dam; general derrick-boat work.

TABLE IX.—Report of operations of derrick boats for the calendar year ending Dec. 31, 1916—(Continued).

1. Name, letter, or number.	No. 19, Hudson River.	No. 80, Hudson River.	No. 24, U. S. F. D. Wheeling.	No. 49, U. S. F. D. Kanawha.	No. 49, U. S. F. D. Wheeling.
2. District.	First New York.	First New York.	Wheeling, W. Va.	Wheeling, W. Va.	Wheeling, W. Va.
3. Where built.	Albany, N. Y.	Albany, N. Y.	Dam No. 26, Ohio River.	Point Pleasant, W. Va.	Dam No. 28, Ohio River.
4. When built.	1913.	1913.	1910.	1913.	1913.
5. Builder.	U. S. Engineer Department.	U. S. Engineer Department.	United States.	Kanawha Dock Co.	United States.
6. Time to build.	7 months.	7 months.	4 months.	About 2 months.	6 months.
7. Material of hull.	Wood.	Wood.	Wood.	Wood.	Wood.
8. Cost of hull.	\$540; second hand.	\$540; second hand.	\$7,437.45.	\$1,585.	\$4,080.92.
9. Cost of machinery.	\$5,442.70.	\$5,442.70.	\$2,438.50.	\$327 (estimated).	\$6,089.90.
10. Total cost.	\$5,982.70.	\$5,982.70.	\$2,975.95.	\$1,912 (approximate).	\$5,907.04.
11. Present value.	\$1,008.	\$777.	\$3,000.	\$900.	\$4,500.
12. Length.	79 feet 6 inches.	81 feet.	75 feet.	68 feet.	75 feet.
13. Beam.	27 feet.	27 feet 6 inches.	35 feet.	24 feet.	35 feet.
14. Depth.	8 feet 8 inches.	8 feet 6 inches.	4 feet 10 inches.	3 feet 8 inches.	4 feet 6 inches.
15. Draft forward.	2 feet 6 inches.	2 feet 6 inches.	2 feet 6 inches.	10 inches.	1 foot 8 inches.
16. Draft aft.	4 feet 6 inches.	3 feet 3 inches.	2 feet 4 inches.	10 inches.	1 foot 10 inches.
17. Displacement.	204 tons.	145 tons.	160 tons.	35 tons.	170 tons.
18. Mast:					
(a) Height.	47 feet 6 inches.	39 feet.	24 feet.	20 feet.	35 feet.
(b) Dimensions.	11 by 12 inches (A frame).	14 by 14 inches.	14 by 14 inches.	12 by 12 inches.	15½ by 15½ inches.
19. Boom:					
(a) Length.	71 feet.	70 feet.	65 feet.	45 feet.	65 feet.
(b) Dimensions.	17 inches diameter.	14 by 15 inches.	14 by 14 inches.	10 by 10 inches.	14 by 14 inches.
(c) How braced.	4 hog rods.	None.	4 hog rods and 2 spider spreaders.	½-inch tendon rod.	4 hog rods and 2 spiders.
(d) Capacity in tons.	10.	10.	13.	4.	10.
20. Bull-wheel diameter.	10 feet 4 inches.	12 feet.	20 feet.	None.	20 feet 8 inches.
21. Buckets:					
(a) Type.	Orange peel.	Clamshell.	Clamshell or orange peel.	do.	Clamshell or orange peel.
(b) Capacity.	1 cubic yard.	1 cubic yard.	½ cubic yards.	do.	½ cubic yards.
22. Hoisting engine:					
(a) Make.	Lambert.	Lidgerwood.	Lidgerwood.	do.	Mead-Morrison Manufacturing Co.
(b) Number of drums.	3.	2.	3.	do.	2.
(c) Dimensions of cylinders.	8 by 10 inches.	8 by 10 inches.	10 by 12 inches.	do.	10 by 12 inches.
(d) Diameter of rope.	½-inch wire rope.	½-inch wire rope.	½ inch.	do.	½ inch.
23. Swinging engine:					
(a) Make.	Lambert.	Lidgerwood.	Lidgerwood.	do.	American Hoist & Derrick Co.
(b) Number of drums.	1.	1.	1.	do.	1.
(c) Dimensions of cylinders.	6½ by 10 inches.	6½ by 8 inches.	6½ by 10 inches.	do.	7 by 8 inches.
(d) Diameter of rope.	½-inch wire rope.	½-inch wire rope.	½ inch.	do.	½ inch.

24. Bidders:			
(a) Height or length.	8 feet.	13 feet 6 inches.	11 feet 6 inches.
(b) Diameter.	42 inches.	50 inches.	40 inches.
(c) Heaving surface.	270 square feet.	354 square feet.	330 square feet.
(d) Working pressure	100 pounds.	100 pounds.	100 pounds.
OPERATING COST.			
25. Pay roll.	\$6,065.59	\$2,287.95	\$2,943.20
26. Supplies.	2,397.07	1,441.24	1,793.12
27. Repairs:			
(a) Hull.	31.43	992.52	340.11
(b) Machinery.	1,357.97	1,185.33	882.75
28. Miscellaneous.	244.45	250.33	242.13
29. Total cost.	\$10,000.54	\$6,207.42	\$6,177.29
30. Number of men in crew.	5.	3 (when working)	3 (4 when double-shifted).
31. Number of days under steam.	281.	280.	339.
32. Work done during year and where operated.	(1).	(1).	(1).
	Remarks.	Remarks.	Remarks.
	1 Removing old State dam; general derrick boat work.	Handling sand and gravel for concrete; banking and filling cofferdam; coaling plant; unloading construction materials from flats and barges; removing plant and materials from cofferdams after completion of work therein; all in connection with construction of Dams Nos. 21 and 22, Ohio River.	1 Miscellaneous dredging and hoisting in construction of dam No. 21, Ohio River.

TABLE IX.—Report of operations of derrick boats for the calendar year ending Dec. 31, 1916.

	No. 44. U. S. E. D. Whaling.	No. 116.	No. 297.	No. 319.	No. 476.
1. Name, letter, or number					
2. District					
3. Where built	Wheeling, W. Va. Dam No. 28, Ohio River	Vicksburg, Miss. do	Rock Island, Ill. Milan, Ill.	Rock Island, Ill. Milan, Ill.	Rock Island, Ill. Des Moines Rapids Canal and Alton Slough.
4. When built	1915.	1907.	1908.	1909.	1912-13.
5. Builder	United States.	United States.	United States.	United States.	Unknown.
6. Time to build	3 months.	About 2 months.	Wood.	Wood.	Crescented fir.
7. Material of hull	W. wood.	W. wood.	W. wood.	W. wood.	Unknown.
8. Cost of hull	\$8,155.03.	\$1,341.	\$1,253.	\$2,334.89.	\$2,334.89.
9. Cost of machinery	\$3,080.72.	\$759.	\$1,331.	\$2,894.	\$2,894.79.
10. Total cost	\$11,235.75.	\$2,100.	\$2,101.22.	\$2,929.54.	\$4,130.68.
11. Present value	\$9,000.	\$1,000.	\$2,101.22.	\$2,929.54.	\$3,080.72.
12. Length	75 feet.	69 feet.	100 feet.	70 feet.	110 feet.
13. Beam	35 feet.	29 feet.	20 feet.	26 feet.	24 feet.
14. Depth	4 feet 5 inches.	4 feet.	4 feet 6 inches.	4 feet 7 inches.	5 feet.
15. Draft forward	2 feet.	1 foot 3 inches.	1 foot 2 inches.	2 feet 6 inches.	1 foot 5 inches.
16. Draft aft	2 feet 4 inches.	1 foot 3 inches.	2 feet 2 inches.	10 inches.	1 foot 5 inches.
17. Displacement	160 tons.	69.47 long tons.	80 tons.	65 tons.	132 tons.
18. Mast:					
(a) Height	32 feet.	None.	18 feet.	20 feet.	40 feet.
(b) Dimensions	16 by 16 inches.	16 by 16 inches.	12 by 12 inches.	12 by 14 inches.	14 by 14 inches.
19. Boom:					
(a) Length	75 feet.		40 feet.	56 feet.	57 feet.
(b) Dimensions	14 by 14 inches.		12 by 14 inches.	14 by 16 inches.	14 by 14 inches.
(c) How braced	Four 1-inch hog rods, 2 spider spreaders.		Stiff leg.	Frame and stiff legs.	2 hog chains.
(d) Capacity in tons	12.	12.	12.	12.	10.
20. Bull-wheel diameter	20 feet.	12.	12 feet.	12 feet 6 inches.	18 feet.
21. Bucket:					
(a) Type	Clamshell or orange peel.		Clamshell.	Clamshell and drag line.	1 Page drag line and 1 clamshell.
(b) Capacity	1½ cubic yards.		1½ cubic yards.	Clamshell 1½ cubic yards, drag line 1½ yards.	2 cubic yards each.
22. Hoisting engine:					
(a) Make	Mead-Morrison Manufacturing Co.	Wright & Adams Co., Quincy, Ill.	American Hoist & Derrick Co.	American Hoist & Derrick Co.	American Hoist & Derrick Co.
(b) Number of drums	2.	1.	2.	2.	2.
(c) Dimensions of cylinders	10 by 12 inches.	5-inch diameter, 6-inch stroke.	8½ by 10 inches.	8½ by 10 inches.	8½ by 10 inches.
(d) Diameter of rope	½ inch.	1½-inch manilla.	½-inch wire cable.	½-inch wire cable.	½-inch wire cable.

22. Swinging engine:		American Hoist & Derrick Co.	Friction attachment.	Wright & Adams Co., Quincy, Ill.	Nation Hoisting Engine Co.	American Hoist & Derrick Co.
(a) Make.						
(b) Number of drums						
(c) Dimensions of cylinders.						
(d) Diameter of rope.						
24. Boiler:						
(a) Height or length.						
(b) Diameter						
(c) Heating surface.						
(d) Working pressure						
OPERATING COST.						
25. Pay roll.		\$3,139.08	\$885.00	\$5,719.54	\$1,140.00	\$566.83
26. Supplies.		1,324.14	245.09	2,456.91	319.84	7.17
27. Repairs:						
(a) Hull.		170.46	383.81	133.46	572.40	31.37
(b) Machinery.		925.43	122.18	94.12	245.63	1.95
28. Miscellaneous.		205.29		9.75		
29. Total cost.						
30. Number of men in crew.		\$5,825.05		\$8,413.80	\$1,650.08	\$907.32
31. Number of days under steam.		306		99	113	99
32. Work done during year and where operated.						
		Remarks.	Remarks.	Remarks.	Remarks.	Remarks.
		Handling sand and gravel for concrete; aiding in cofferdam construction; banking and filling cofferdam; coaling plant; unloading construction materials from flats and barges; removing plant and materials from cofferdams after completion of permanent work and before high water, all in connection with construction of Lock and Dam No. 22, Ohio River.	Mississippi River, Rock Island Division, Le Clairs Canal, unloading sand and rock and building dams. Excavating mud from chamber of Moline Lock. Includes coal, \$82.50.	Employed in Tallahatchie River, Miss.; 964 snags pulled, 1,104 stumps pulled, 3,899 shore snags cut, 791 logs removed from channel, 29 tree slides removed from channel, 3,619 leaning trees cut, 1 side jam removed, 282 trees girdled, 1 wreck removed.	Mississippi River, Rock Island Division, Le Clairs Canal, unloading sand and rock and building dams. Including coal \$83.50.	Was employed entire year on work mentioned above—Upper Mississippi River, division "Hannibal to Missouri River." Rocking bank on Eagle Nest and Ellis Islands and below Wood River.

TABLE IX.—Report of operations of derrick boats for the calendar year ending Dec. 31, 1916—Continued.

1. Name, letter, or number.....	No. 503.	No. 579.	No. 1017.	No. 1109.
2. District.....	Rock Island, Ill.	Third Mississippi River, Vicksburg, Miss.	Mississippi River, first and second districts, Memphis, Tenn.	Third Mississippi River district.
3. Where built.....	Milan, Ill.	Levanah, Ohio.	Memphis, Tenn.	Memphis, Tenn.
4. When built.....	1914.	Hull, 1914; machinery 1911.	1911.	1911.
5. Builder.....	United States	Machinery, American Hoist & Derrick Co.	United States	Tennessee Contracting Co.
6. Time to build.....	4 months.	Not known.	2 months.	Unknown.
7. Material of hull.....	Wood.	Wood.	Cresoted wood.	Wood.
8. Cost of hull.....	\$1,999.16.	\$1,200.	\$5,499.40.	Unknown.
9. Cost of machinery.....	\$1,011.70.	\$2,500.	Old equipment used.	Do.
10. Total cost.....	\$3,010.86.	\$3,700.	\$5,999.40.	\$3,800.
11. Present value.....	\$4,465.64.	\$4,000.	\$4,261.47.	\$2,000.
12. Length.....	66 feet.	120 feet.	90 feet.	90 feet.
13. Beam.....	22 feet.	30 feet.	32 feet.	24 feet.
14. Depth.....	4 feet 6 inches.	6 feet.	5 feet.	5 feet.
15. Draft forward.....	1 foot 3 inches.	2 feet.	11 inches.	1 foot 1 inch.
16. Draft aft.....	1 foot 3 inches.	2 feet.	11 inches.	3 inches.
17. Displacement.....	53 tons.	170 long tons.	74 tons.	45.1 long tons.
18. Mast.....	(a) Height..... (b) Dimensions.....	26 feet. 10 by 16 inches.	30 feet. 10-inch channels, luffed, 14 1/2 inches outside.	24 feet 4 inches. 10 by 10 inches.
19. Boom.....	(a) Length..... (b) Dimensions..... (c) How braced.....	45 feet. 10 by 10 inches.	75 feet. 30 inches square at middle.	60 feet. 9 by 9 inches.
20. Built-wheel diameter.....	(a) Capacity, in tons.....	5.	Luffed.	7.
21. Bucket.....	(a) Type..... (b) Capacity.....	None.	None.	None.
22. Hoisting engine.....	(a) Make..... (b) Number of drums..... (c) Dimensions of cylinders..... (d) Diameter of rope.....	American Hoist & Derrick Co. 2. 2. 6 1/2 by 8 inches. 1-inch cable.	J. S. Mundy, Newark, N. J. 2. 10 by 14 inches. 1-inch steel cable.	Mundy. 2. Two, 8 1/2 by 10 inches. 1 inch.
23. Swinging engine.....	(a) Make..... (b) Number of drums..... (c) Dimensions of cylinders..... (d) Diameter of rope.....	Attached to main hoisting engine. do. do. 1 inch.	None.	Unknown. 1. One 5 by 6 inches. 1-inch manila.

24. Boiler.	10 feet.....	Upright, 7 feet 1 inch high.....	9 feet 3 inches high.....	7 feet.....
(a) Height or length.....	48 inches.....	39 inches.....	64 inches.....	36 inches.....
(b) Diameter.....	392 square feet.....	200 square feet.....	280 square feet.....	180 square feet.....
(c) Heating surface.....	125 pounds.....	125 pounds.....	100 pounds allowed.....	65 pounds.....
(d) Working pressure.....				
25. Pay roll.....	\$971.84	\$2,832.54	\$1,294.52	\$2,594.06
26. Supplies.....	606.16	174.91	484.84	132.50
27. Repairs.....				
(a) Hull.....		215.15		193.46
(b) Machinery.....	44.72	94.50	10.40	16.66
28. Miscellaneous.....	28.25			
29. Total cost.....	\$1,700.97	\$3,222.10	\$1,789.76	\$3,204.07
30. Number of men in crew.....	5 single, 9 double.....	8.....	5.....	8.....
31. Number of days under steam.....	106.....	98.....	63 (467 hours' work, 41 hours' delay).....	120.....
32. Work done during year and where operated.....	Unloading barges and grading bank.....	(1).....	(1).....	(1).....
	Remarks.....	Remarks.....	Remarks.....	Remarks.....
	This boat was not used as a derrick boat, but was fitted with a shovel arm, sliding through a trunnion on the boom, by means of which the material was pushed from the barges.	1 Operated with brush party No. 1; loaded 28,500 cords of willow brush and poles for bank re- tment work at Panther Forest, Ark., Greenville, Cotton- wood, and Fitlers, Miss.	1 Laid up 7 months at Delta, Miss., with revetment party used for bank concreting 44 months at Delta, Miss., and 4 month at Star Landing, Miss.; handled 3,620 cubic yards of concrete; bank paved, 2,925 squares.	1 Operated with brush party No. 2; loaded 27,800 cords of willow brush and poles for re- tment work at Panther Forest, Ark., Greenville, Fitlers, and Cottonwood, Miss.

TABLE IX.—*Report of operations of derrick boats for the calendar year ending Dec. 31, 1916—Continued.*

1. Name, letter, or number.	No. 1511.	No. 1411.	No. 1603.	No. 1804.
2. District.	Third Mississippi River.	Mississippi River, first and second districts, Memphis, Tenn. Memphis, Tenn.	Third Mississippi River.	Third Mississippi River.
3. Where built.	Memphis, Tenn.	Memphis, Tenn.	Vielsburg, Miss.	Vielsburg, Miss., Government fleet.
4. When built.	1913.	1914.	1915.	1915.
5. Builder.	Tennessee Contracting Co.	United States.	Third district fleet.	U. S. fleet.
6. Time to build.	Unknown.	13 months.	2 months.	2 months.
7. Material of hull.	Wood.	Crescoted wood.	Crescoted pine.	Crescoted pine.
8. Cost of hull.	Unknown.	\$4,831.70.	\$4,400.	\$4,400.
9. Cost of machinery.	do.	\$3,650.	\$4,074.35.	\$4,010.40.
10. Total cost.	\$4,280.	\$8,481.70.	\$8,474.35.	\$8,410.40.
11. Present value.	\$2,500.	\$8,135.46.	\$8,000.	\$8,000.
12. Length.	100 feet.	90 feet.	120 feet.	120 feet.
13. Beam.	24 feet.	32 feet.	30 feet.	30 feet.
14. Depth.	3 feet.	5 feet.	7 feet.	7 feet.
15. Draft forward.	1 foot.	1 foot 2 inches.	1 foot 9 inches.	1 foot 9 inches.
16. Draft aft.	1 foot.	1 foot.	1 foot 9 inches.	1 foot 9 inches.
17. Displacement.	66.9 long tons.	84 long tons.	140 tons.	150 tons.
18. Mast:				
(a) Height.	20 feet 4 inches.	31 feet.	24 feet.	24 feet.
(b) Dimensions.	10 by 10 inches.	10-inch channels, 14 inches outside latticed.	14 by 14 inches.	14 by 14 inches.
19. Boom:				
(a) Length.	60 feet.	75 feet.	70 feet.	70 feet.
(b) Dimensions.	9 by 9 inches.	30 inches square at middle.	12 by 12 inches.	12 by 12 inches.
(c) How braced.		Latticed.	Truss rods and spreader.	Truss rods and spreader.
(d) Capacity in tons.		7.	2.	2.
20. Bull-wheel diameter.		20 feet.	16 feet.	16 feet.
21. Bucket:				
(a) Type.		None.	Clamshell.	Clamshell.
(b) Capacity.			1 cubic yard.	1 cubic yard.
22. Hoisting engine:				
(a) Make.	American Holst & Derrick Co.	Reliance Machine & Tool Works.	American Holst & Derrick Co.	American Holst & Derrick Co.
(b) Number of drums.	2.	3.	3.	3.
(c) Dimensions of cylinders.	Two 6½ by 10 inches.	8½ by 10 inches.	Double, 7 by 10 inches.	Double, 7 by 10 inches.
(d) Diameter of rope.	1-inch.	1-inch steel cable.	1-inch.	1-inch.
23. Swinging engine:				
(a) Make.	Unknown.	None; slewing attachment to main engine.	American Holst & Derrick Co.	American Holst & Derrick Co.
(b) Number of drums.	1.		1.	1.
(c) Dimensions of cylinders.	Two 3½ by 6 inches.		Double, 5 by 7 inches.	Double, 5 by 7 inches.
(d) Diameter of rope.	1-inch Manila.	1-inch steel cable.	1-inch.	1-inch.

24. Boiler:	7 feet 1 inch. 36 inches..... (a) Diameter..... (b) Heating surface..... (c) Working pressure..... (d) 110 pounds.....	9 feet high. 48 inches..... 300 square feet..... 125 pounds.....	7 feet 1 inch. 43 inches..... 260 square feet..... 125 pounds.....	7 feet 1 inch. 43 inches..... 260 square feet..... 125 pounds.....	
25. Pay roll.....	\$1,703.34	(1)	\$28.00	\$3,093.14	\$3,963.83
26. Supplies.....	112.80			150.00	180.00
27. Repairs.....					
(a) Hull.....	112.47			103.67	142.87
(b) Machinery.....	5.60			64.36	8.15
28. Miscellaneous.....					
Total cost.....	\$1,924.21			\$3,411.17	
29. Number of men in crew.....	8.....			18.....	18.....
30. Number of days under steam.....	92.....			109.....	52.....
31. Work done during year and where operated.....	(1).....			(1).....	(1).....
Remarks.					
Remarks.		Remarks.		Remarks.	
1 Operated with brush party No. 3, loading 19,700 cords of willow brush for revetments at Panther Forest, Ark.; Bolivar, Greenville, Fidler, and Cottonwood, Miss.		1 Includes cost of cabin. 2 Operating labor charged to field parties. 3 Under steam from time to time as required.		1 Worked in connection with concrete barge No. 063; placed 324,800 square feet of concrete upper bank paving at Greenville and Bolivar, Miss., Panther Forest and Vaulcuse, Ark.	
				1 Worked in connection with concrete mixing barge No. 086; placed 479,100 square feet of upper bank concrete pavement at Cottonwood, Miss., revetment.	

TABLE X.

PILE DRIVERS.

4317

TABLE X.—Report of operations of pile drivers for the calendar year ending Dec. 31, 1916.

Name.....	Lithport.	Tackle.	No. 1.	No. 1-B.	Pile-driver No. 1.
2. District.....	Wilmington, N. C.....	San Francisco, Cal. (third). Oakland, Cal.....	Kansas City, Mo. 1906 United States, by hired labor	Kansas City, Mo. Bismarck, N. Dak. 1895 United States by hired labor	Little Rock, Ark. Batesville, Ark. 1915 United States engineers.
3. Where built.....	do.....	4 months.....	No record	No record	80 days.
4. When built.....	1903 and 1912.....	Wood.....	Wood	Wood	Wood.
5. Builder.....	Louis Skinner and U. S. Engineer Department.	\$4,270.....	\$1,500.....	\$2,500.....	\$2,754.96.
6. Time to build.....	5 months.....	\$7,255.62.....	\$3,380.....	No record	\$2,708.31.
7. Material of hull.....	do.....	\$6,525.62.....	\$4,880.....	do.....	\$5,461.21.
8. Cost of hull.....	\$1,485.....	\$1,800.....	\$750.....	9000.....	\$4,875.
9. Cost of machinery.....	\$3,446.66.....	64 feet.....	76 feet.....	56 feet.....	80 feet.
10. Total cost.....	\$4,931.66.....	24 feet.....	19 feet.....	18 feet.....	24 feet.
11. Present value.....	\$50 (hull only).....	3 feet 6 inches.....	4 feet 4 inches.....	4 feet 4 inches.....	4 feet.
12. Length.....	60 feet.....	1 foot 10 inches.....	1 foot 7 inches.....	1 foot 2 inches.....	1 foot 6 inches.
13. Beam.....	24 feet.....	1 foot 8 inches.....	1 foot 7 inches.....	10 inches.....	1 foot 7 inches.
14. Depth.....	5 feet 1 inch.....	58.....	61.....	25.....	75 tons.
15. Draft forward.....	2 feet 1 inch.....	No regular crew.....	As grader, 6; as driver, 11.....	6.....	(2).
16. Draft aft.....	1 foot 1 inch.....	50 feet.....	52 feet.....	55 feet.....	None.
17. Displacement (long tons).....	82.....	2,500 pounds.....	6,500 pounds.....	6,800 pounds.....	No hammer.
18. Number of men in crew.....	No regular crew.....	3 feet by 18 by 12 inches.....	11 feet 1 inch by 19 inches.....	10 feet by 19 inches.....	
19. Height of leaders.....	50 feet.....	1 inch.....	1-inch steel.....	1-inch manila.....	None.
20. Weight of pile hammer.....	6,900 pounds, striking part 3,000 pounds.....	None.....	Vulcan.....	Vulcan.....	Do.
21. Dimensions of pile hammer.....	21 inches by 11 feet.....	do.....	14 by 7 by 12 inch Duplex.....	14 by 7 by 12 Duplex Worth- ington.....	5-inch suction, 4-inch dis- charge, 8 and 6 by 10-inch Duplex.
22. Diameter of rope.....	1-inch wire cable.....	Lidgerwood.....	Lambert holst.....	St. Paul Holst & Derrick Co. (Co.).....	American Holst & Derrick Co.
23. Type of steam hammer.....	Warrington steam hammer.....	2.....	2.....	2.....	2.
24. Size of jet pump.....	10 by 7 by 10 inches.....	7 by 10 inches.....	64 by 10 inches.....	7 by 10 inches.....	84 by 10 inches.
25. Engine: (a) Make.....	American Holst & Derrick Co.....	84 inches.....	16 feet 3 inches.....	22 feet long by 4 feet 6 inches high.....	Horizontal, locomotive type.
(b) Number of drums.....	2.....	40 inches.....	4 feet.....	3 feet.....	44 inches.
(c) Dimensions of cylinders.....	84 by 10 inches.....	46 3/4 inches.....	407 square feet.....	726 square feet.....	416 square feet.
26. Boiler: (a) Height.....	96 inches.....	100 pounds.....	100 pounds.....	120 pounds.....	100 pounds.
(b) Diameter.....	48 inches.....				
(c) Heating surface.....	364 square feet.....				
(d) Working steam pressure.....	125 pounds.....				

FLOATING PLANT.

4810

OPERATING COST.

27. Pay roll.....	\$207.37	(1)			
28. Supplies.....	18.81				
29. Repairs:					
(a) Hull.....	107.02	607.37			
(b) Machinery.....		170.80			
30. Miscellaneous.....					57.92
Total cost.....	\$333.20				
31. Work done during year.....			184,345.77		(1)
32. and where operated.			1,082 piles driven; 6,143 linear feet of bank graded.		
33. Number of days worked during year.	20	(2)	187 ¹		(1)

Remarks.

The pile-driving machinery has been removed, as the hull is unsafe for use as a pile driver.

Remarks.

¹ Included in operating cost of U. S. dredges Sacramento and San Joaquin, and wing dam construction on Sacramento River.

Remarks.

¹ Cost both as pile driver and as grader.

Remarks.

¹ General use in connection with dredging operations at mouth and wing dam construction in upper portion of Sacramento River.

Remarks.

¹ Outfit for quarters, tools etc. \$981.84 additional.

Remarks.

² Not operated as a separate unit. Used for setting mooring piles for suction dredges in Arkansas River and operated by members of dredge crew.

TABLE X.—Report of operations of pile drivers for the calendar year ending Dec. 31, 1916—Continued.

1. Name.....	No. 1, O. E.	No. 1.	No. 1.	No. 1, M. E.	No. 1.
2. District.....	Louisville, Ky.....	Milwaukee, Wis.....	New Orleans, La.....	Pittsburgh, Pa.....	Savannah, Ga.
3. Where built.....	Elizabeth, Pa. (hull).....	Sheboygan, Wis.....	New Orleans and Fort Eads, La.....	Lock 4, Pa.....	Macon, Ga.
4. When built.....	1914.....	1894.....	1908; rebuilt in 1910.....	1904.....	1910.....
5. Builder.....	Monongahela River Consolidated Coal & Coke Co. ¹	Rieboldt, Wolter & Co.....	Engineer Department.....	United States.....	U. S. Engineer Department.
6. Time to build.....	2 months.....	Unknown.....	No record.....	Wood.....	15 days.
7. Material of hull.....	Wood.....	Wood.....	Wood.....	\$2,750.....	Yellow pine.
8. Cost of hull.....	\$1,958.97.....	\$2,150.....	\$4,007.47.....	\$2,750.....	\$800, approximately.
9. Cost of machinery.....	\$4,199.15.....	\$1,300.....	\$1,450.....	\$741.....	\$1,000, approximately.
10. Total cost.....	\$6,158.12.....	\$3,450.....	\$5,457.47.....	\$3,500.....	\$1,900, approximately.
11. Present value.....	\$4,200.....	\$1,600.....	\$2,000.....	\$1,000.....	\$1,000.
12. Length.....	70 feet.....	66 feet 4 inches.....	55 feet.....	50 feet.....	44 feet 6 inches.
13. Beam.....	22 feet.....	21 feet 4 inches.....	25 feet.....	25 feet 6 inches.....	16 feet 8 inches.
14. Depth.....	4 feet 5 inches.....	6 feet 6 inches.....	4 feet.....	4 feet.....	3 feet 6 inches.
15. Draft forward.....	2 feet.....	1 foot 1 inch.....	2 feet.....	2 feet.....	6 inches.
16. Draft aft.....	2 feet 5 inches.....	1 foot 8 inches.....	2 feet.....	1 foot 3 inches.....	1 foot 3 inches.
17. Displacement (long tons).....	88.....	111.....	71.....	68.....	14.
18. Number of men in crew.....	2 to 27.....	2.....	8.....	6.....	(1)
19. Height of leaders.....	51 feet.....	45 feet 4 inches.....	60 feet.....	50 feet 3 inches.....	30 feet.
20. Weight of pile hammer.....	5,500 pounds.....	3,000 pounds.....	5,500 pounds.....	3,500 pounds.....	2,500 pounds.
21. Dimensions of pile hammer.....	81 by 25 by 15 inches.....	18 by 18 inches by 4 feet 1½ inches.....	23 by 23 by 22 inches.....	2 feet 2½ inches by 1 foot 3½ inches by 4 feet 6½ inches.....	3 feet long, 19½ inches between leads, 2½-inch face 1 inch.
22. Diameter of rope.....	1 and 1 inch.....	2-inch manilla.....	1-inch wire cable.....	1-inch wire or 1½-inch manilla.....	1 inch.
23. Type of steam hammer.....	Union Iron Works.....	Drop hammer.....	Vulcan, No. 119.....	Drop hammer.....	None.
24. Size of jet pump.....	10-inch steam, 7-inch pump, 12-inch stroke.....	Steam, 7 by 10 inches; water, 4½ by 10 inches.....	None.....	Drop hammer.....	Do.
25. Engine: (a) Make.....	Mundy.....	J. S. Mundy.....	Orr & Sempower.....	Lambert Hoisting Engine Co.....	Mundy.
(b) Number of drums of cylinders.....	3.....	2.....	7-inch diameter, 10-inch stroke.....	2.....	2.
(c) Dimensions of cylinders.....	7½ by 10 inches.....	8 by 12 inches.....	2-inch diameter, 10-inch stroke.....	8-inch diameter, 10-inch stroke.....	7½ by 10 inches.
26. Boiler: (a) Height.....	7 feet 7½ inches.....	9 feet.....	7 feet.....	8 feet.....	7 feet 6 inches.
(b) Diameter.....	4 feet.....	4 feet 4 inches.....	3 feet 7 inches.....	43 inches.....	3 feet 3 inches.
(c) Heating surface.....	68 square feet.....	571 square feet.....	323 square feet.....	100 pounds.....	250 square feet.
(d) Working steam pressure.....	126 pounds.....	100 pounds.....	100 pounds.....	100 pounds.....	110 pounds.

4321

Digitized by Google

TABLE X.—*Report of operations of pile drivers for the calendar year ending Dec. 31, 1916—Continued.*

1. Name.....	No. 1.	No. 1.	No. 2.	No. 2.	No. 2.
2. District.....	Second, Portland, Oreg.....	St. Louis, Mo. Cincinnati, Ohio.....	Kansas City, Mo. Gasconade, Mo.....	Milwaukee, Wis. Sturgeon Bay, Wis.....	Little Rock, Ark. Batesville, Ark.....
3. Where built.....	1905.....	1894.....	1915.....	1906.....	1915.....
4. When built.....	4 weeks.....	11 months.....	90 days (estimated).....	Reiboldt, Wolter & Co. Wood.....	U. S. Engineers. 80 days.....
5. Builder.....	U. S. Engineer Department. 4 weeks.....	Samuel W. Coffin & Son. Wood.....	United States. Wood.....	Unknown.....	U. S. Engineers. 80 days.....
6. Time to build.....	4 weeks.....	11 months.....	90 days (estimated).....	Wood.....	U. S. Engineers. 80 days.....
7. Material of hull.....	4 weeks.....	11 months.....	90 days (estimated).....	Wood.....	U. S. Engineers. 80 days.....
8. Cost of hull.....	\$855.....	\$1,500.....	\$2,572.25.....	\$2,000.....	\$2,754.95.....
9. Cost of machinery.....	\$300.....	\$3,000.....	\$3,400.....	\$2,840.....	\$2,706.31.....
10. Total cost.....	\$1,355.....	\$4,500.....	\$5,972.25.....	\$4,840.....	\$5,461.21.....
11. Present value.....	\$150.....	\$1,700.....	\$3,972.25.....	\$2,700.....	\$4,875.....
12. Length.....	60 feet.....	68 feet.....	70 feet.....	60 feet.....	80 feet.....
13. Beam.....	22 feet.....	20 feet.....	19 feet.....	26 feet 4 inches.....	24 feet.....
14. Depth.....	3 feet 6 inches.....	3 feet 14 inches.....	4 feet 6 inches.....	4 feet 6 inches.....	4 feet.....
15. Draft forward.....	1 foot 6 inches.....	2 feet 1 inch.....	2 feet 2 inches.....	1 foot 6 inches.....	1 foot 6 inches.....
16. Draft aft.....	1 foot.....	2 feet 1 inch.....	1 foot 3 inches.....	1 foot 3 inches.....	1 foot 7 inches.....
17. Displacement (long tons).....	38.....	73.....	50.....	118.....	75 tons.....
18. Number of men in crew.....	7, when operating.....	8.....	10.....	2.....	(?).....
19. Height of leaders.....	40 feet.....	42 feet.....	55 feet 8 inches.....	50 feet.....	None.....
20. Weight of pile hammer.....	2,100 pounds.....	2,400 pounds.....	6,500 pounds.....	3,600 pounds.....	No hammer.....
21. Dimensions of pile hammer.....	37½ by 21½ by 18 inches.....	16 by 20 by 42 inches.....	11 feet 8 inches by 19 inches.....	20 by 24 inches by 4 feet.....	None.....
22. Diameter of rope.....	1½ inches.....	1½ manila.....	1½ inch steel.....	1½-inch manila.....	None.....
23. Type of steam hammer.....	None.....	None.....	Warnington (Vulcan Iron Works).....	Drop hammer.....	Do.....
24. Size of jet pump.....	do.....	Duplex, 9 by 5½ by 12 inch stroke.....	Steam cylinders 12 and 22 inches, stroke 20 inches, pluger 10 inches (Geo. F. Blake Manufacturing Co.).....	Steam, 6 by 10 inches; water, 4 by 10 inches.....	5-inch suction, 4-inch discharge, 8 and 6 by 10-inch duplex.....
25. Engine:					
(a) Make.....	Lidgerwood.....	Crooks.....	American Engineering Works.....	Lidgerwood.....	American Hoist & Derrick Co.....
(b) Number of drums.....	1.....	1.....	2.....	2.....	2.....
(c) Dimensions of cylinders.....	8 by 10 inches.....	7 by 10 inches.....	7 by 12 inches.....	9 by 10 inches.....	8½ by 10 inches.....
26. Roller:					
(a) Height.....	6 feet.....	14 feet.....	5 feet 2½ inches.....	9 feet 6 inches.....	Horizontal, locomotive type. 44 inches.....
(b) Diameter.....	2 feet 11 inches.....	42 inches; four 10-inch flues.....	4 feet 1.2 inches.....	4 feet 2 inches.....	44 inches.....
(c) Heating surface.....	126 square feet.....	250 square feet.....	512 square feet.....	476.7 square feet.....	416 square feet.....
(d) Working steam pressure.....	100 pounds.....	125 pounds.....	125 pounds.....	100 pounds.....	100 pounds.....

OPERATING COST.

27. Pay roll.....	\$1,859.67				
28. Supplies.....	191.61				
29. Repairs:					
(a) Hull.....	\$11.47				
(b) Machinery.....	52.81				
30. Miscellaneous.....	435.84				
31. Total cost.....	\$2,487.12	\$64.28		\$60.75	
32. Work done during year and where operated.....		See remarks.		See remarks.	
33. Number of days worked during year.....	(1) 62		16.		
Remarks.					
Upon completion of the season's work the driver was worn beyond repair.		Mississippi River between mouths of Ohio and Missouri Rivers.		Pile driver No. 2 was sunk by the ice at Waverly Bend, Mo., on Feb. 18, 1916. See special report of May 13, 1916.	
Operated on the Willamette River above Portland, Ore., where 83 piling were driven and 1,218 cubic yards of stone placed in repairing the dam and riverment near Wheatland, Ore.		Not in commission during the year.		Not operated during year.	
				One hundred and twenty-five round piles, 24 feet long, driven for reinforcing anchorage to revetment between stations 42 and 52 south side, Sturgeon Bay Canal, Wis.	
				Outfit for quarters, tools, etc., \$961.84 additional.	
				Not operated as a separate unit. Used for setting mooring piles for suction dredges in Arkansas River and operated by members of dredge crew.	
				57.92	
				(1)	
				(1)	

TABLE X.—Report of operations of pile drivers for the calendar year ending Dec. 31, 1916—Continued.

1. Name.....	No. 2, O. R.		No. 2.		No. 2.		No. 2.		No. 3.	
2. District.....	Louisville, Ky.....	New Orleans, La.....	Pittsburgh, Pa.....	Second, Portland, Oreg.....	Kansas City, Mo.		No. 3.			
3. Where built.....	Elizabeth, Pa. (hull).....	West Lake, La.....	Lock 4, Pa.....	Portland, Oreg.....	Gasconade, Mo.					
4. When built.....	1914.....	1909-10.....	1908.....	1912.....	1913.....					
5. Builder.....	Monongahela River Consoli- dated Coal & Coke Co.1	Peter Estabald.....	United States.....	Joseph Supple.....	United States.....					
6. Time to build.....	2 months.....	4 months.....	Wood.....	3 months.....	130 days.....					
7. Material of hull.....	Wood.....	Wood.....	Wood.....	Not known.....	Wood.....					
8. Cost of hull.....	\$1,958.97.....	Unknown.....	.....	.....	\$2,560.96.....					
9. Cost of machinery.....	\$4,199.15.....	do.....	.....	.....	\$450.12.....					
10. Total cost.....	\$6,158.12.....	\$9,192.06.....	\$3,750.....	.....	\$3,020.07.....					
11. Present value.....	\$4,200.....	\$6,700.....	\$500.....	.....	\$2,500.....					
12. Length.....	70 feet.....	75 feet 6 inches.....	50 feet.....	70 feet.....	76 feet.....					
13. Beam.....	22 feet.....	30 feet.....	28 feet 4 inches.....	24 feet.....	19 feet.....					
14. Depth.....	4 feet 5 inches.....	5 feet.....	4 feet 7 inches.....	4 feet.....	4 feet 4 inches.....					
15. Draft forward.....	2 feet 3 inches.....	2 feet.....	2 feet.....	1 foot 10 inches.....	1 foot 10 inches.....					
16. Draft aft.....	2 feet 1 inch.....	2 feet 4 inches.....	1 foot 7 inches.....	1 foot 10 inches.....	1 foot 9 inches.....					
17. Displacement (long tons).....	88.....	127.....	66.....	82.....	63.....					
18. Number of men in crew.....	8.....	8.....	.....	8, when operating.....	10.....					
19. Height of leaden.....	51 feet.....	50 feet.....	.....	66 feet.....	56 feet.....					
20. Weight of pile hammer.....	None.....	3,000 pounds.....	.....	3,400 pounds.....	6,500 pounds.....					
21. Dimensions of pile hammer.....	.....	22 by 23½ by 23½ inches.....	.....	22 by 36 by 54 inches.....	11 feet 6 inches by 19 inches.....					
22. Diameter of rope.....	1 and ¾ inch.....	1-inch wire.....	.....	1 inch.....	¾ inch.....					
23. Type of steam hammer.....	.....	No. 2, Warrington.....	.....	None.....	No. 2, Warrington.....					
24. Size of jet pump.....	None.....	None.....	.....	10 by 6 by 10 inches.....	.....				
25. Engine.....	Mundy.....	American Holst & Derrick Co.....	.....	American Holst & Derrick Co.....	Lidgerwood.....					
(a) Make.....	.....	.....	.....	.....	.....
(b) Number of drums.....	2.....	2.....	.....	2.....	2.....					
(c) Dimensions of cylinders.....	7½ by 10 inches.....	8½ by 10 inches.....	.....	8½ by 10 inches.....	7 by 10 inches.....					
26. Boiler.....	.....	.....	.....	.....	.....
(a) Height.....	7 feet 7½ inches.....	8 feet 6 inches.....	20 feet long.....	16 feet (length).....	5 feet 8 inches.....					
(b) Diameter.....	4 feet.....	4 feet.....	53 inches.....	3 feet 6 inches.....	4 feet.....					
(c) Heating surface.....	608 square feet.....	480 square feet.....	5 tubes: One 16-inch; two 11½-inch, and two 10½-inch.....	334 square feet.....	440 square feet.....					
(d) Working steam pressure.....	125 pounds.....	135 pounds.....	.....	125 pounds.....	150 pounds.....					

[illegible]

TABLE X.—Report of operations of pile drivers for the calendar year ending Dec. 31, 1916—Continued.

1. Name.....	No. 3 O. R.	No. 3.	I V-S.	No. 4.	No. 4.
2. District.....	Louisville Ky.....	St. Louis Mo.....	Kansas City Mo.....	Kansas City Mo.....	Mississippi River, first and second districts, Memphis, Tenn Cincinnati, Ohio. 1894. Samuel W. Coffin & Sons.
3. Where built.....	Elizabeth, Pa. (hull).....	Cincinnati, Ohio.....	Sioux City, Iowa.....	Gasconade, Mo.....	
4. When built.....	1914.....	1894.....	1897.....	1914.....	
5. Builder.....	Monongahela River Consolidated Coal & Coke Co. ¹	Samuel W. Coffin & Son.....	United States.....	United States.....	
6. Time to build.....	11 months.....	11 months.....	No record.....	190 days.....	11 months.....
7. Material of hull.....	Wood.....	Wood.....	Wood.....	Wood.....	Wood.....
8. Cost of hull.....	\$1,938.97.....	\$1,500.....	No record.....	\$2,490.34.....	\$1,500.....
9. Cost of machinery.....	\$4,199.15.....	\$3,000.....	do.....	\$389.16.....	\$3,000.....
10. Total cost.....	\$6,138.12.....	\$4,500.....	do.....	\$3,089.50.....	\$4,500.....
11. Present value.....	\$1,500.....	\$1,700.....	\$500.....	\$2,500.....	\$1,500.....
12. Length.....	70 feet.....	68 feet.....	65 feet.....	76 feet.....	68 feet.....
13. Beam.....	22 feet.....	20 feet.....	19 feet.....	19 feet.....	20 feet.....
14. Depth.....	4 feet 5 inches.....	3 feet 1½ inches.....	4 feet 6 inches.....	4 feet 4 inches.....	3 feet 1½ inches.....
15. Draft forward.....	2 feet 2 inches.....	1 foot 8 inches.....	1 foot 9 inches.....	1 foot 10 inches.....	2 feet.....
16. Draft aft.....	2 feet.....	1 foot 8 inches.....	1 foot 9 inches.....	1 foot 9 inches.....	2 feet.....
17. Displacement (long tons).....	88.....	75.....	65.....	62.....	75.....
18. Number of men in crew.....	51.....	8.....	As grader, 6; as driver, 11.....	10.....	8.....
19. Height of leaders.....	51 feet.....	42 feet.....	56 feet.....	56 feet.....	42 feet.....
20. Weight of pile hammer.....	Removed.....	2,400 pounds.....	6,500 pounds.....	6,500 pounds.....	2,400 pounds.....
21. Dimensions of pile hammer.....	.....	15 by 20 by 42 inches.....	Length 10 feet; width, 1 foot 7 inches.....	Length 11 feet; 6 inches cylinder, 10½ by 36 inches.....	15 by 20 by 42 inches.....
22. Diameter of rope.....	1 inch.....	1½-inch manila.....	1½-inch manila.....	1 inch.....	1½-inch manila.....
23. Type of steam hammer.....	.....	None.....	Old-style Vulcan.....	No. 2 Warrington.....	None.....
24. Size of jet pump.....	Removed.....	Duplex, 10 by 6 by 10 inch stroke.....	Duplex, 12 by 7 by 10 inches.....	No. 2 Warrington.....	Duplex, 10 by 6 by 12 inches.....
25. Engine.....	.....	Crooks.....	American Holst & Derrick Co.....	American Holst & Derrick Co.....	Crooks.....
(a) Make.....	Mundy.....	.....	.....	.....	.....
(b) Number of drums.....	3.....	1.....	2.....	2.....	1.....
(c) Dimensions of cylinder.....	7½ by 10 inches.....	7 by 10 inches.....	6½ by 10 inches.....	7 by 10 inches.....	7 by 10 by 10 inches.....
26. Boller: (a) Height.....	7 feet 7½ inches.....	14-foot length.....	8 feet 6 inches.....	15 feet 8 inches (horizontal boiler).....	14-foot length.....
(b) Diameter.....	4 feet.....	42 inches diameter, four 10-inch flues.....	4 feet.....	4 feet.....	42 inches, four 10-inch flues.....
(c) Heating surfaces.....	698 square feet.....	250 square feet.....	468 square feet.....	450 square feet.....	250 square feet.....
(d) Working steam pressure.....	125 pounds.....	133 pounds.....	100 pounds.....	100 pounds.....	135 pounds.....

TABLE X.—Report of operations of pile drivers for the calendar year ending Dec. 31, 1916—Continued.

No. 1.	No. 4.	No. 5.	No. 5.	No. 5.	No. 6.
1. Name.....	Montgomery, Ala. Columbus, Ga. 1904.	Kansas City, Mo. Gassende, Mo. 1914-15.	Montgomery, Ala. Columbus, Ga. 1904; rebuilt 1910, Columbus, Ga. U. S. Engineer Department.	St. Louis, Mo. Cincinnati, Ohio. 1894.	Second Cincinnati. Cincinnati, Ohio. 1899.
2. District.....	Rebuilt, U. S. Engineer De- partment. Wood.	United States.	No record; 3 weeks to rebuild Wood (treated with carbo- lineum).	Samuel W. Coffin & Son	United States.
3. Where built.....	3 weeks.	90 days.		11 months.	2 months.
4. When built.....	Wood.	Wood.		Wood.	Wood.
5. Builder.....					
6. Time to build.....					
7. Material of hull.....					
8. Cost of hull.....	\$750.	\$2,487.68.	\$750, rebuilt.	\$1,500.	\$879.61.
9. Cost of machinery.....	\$715.	\$3,044.23.		\$3,000.	\$935.30.
10. Total cost.....	\$1,465.	\$5,531.91.	\$1,700.	\$4,500.	\$1,808.
11. Present value.....	\$800.	\$5,000.	\$900.	\$1,700.	\$1,500.
12. Length.....	40 feet.	70 feet.	40 feet.	68 feet.	50 feet.
13. Beam.....	18 feet.	19 feet.	18 feet.	20 feet.	28 feet.
14. Depth.....	3 feet.	4 feet 6 inches.	3 feet.	3 feet 1½ inches.	3 feet 10 inches.
15. Draft forward.....	1 foot.	2 feet 2 inches.	1 foot.	2 feet.	1 foot 6 inches.
16. Draft aft.....	1 foot.	1 foot 3 inches.	1 foot.	2 feet.	1 foot 5 inches.
17. Displacement (long tons).....	12.	56.	12.	76.	50.
18. Number of men in crew.....	8.	As grader, 6; as driver, 11.	8.	8.	No crew.
19. Height of leaders.....	30 feet.	55 feet 8 inches.	30 feet.	42 feet.	26 feet.
20. Weight of pile hammer.....	750 pounds.	6,500 pounds.	830 pounds.	2,400 pounds.	2,200 pounds.
21. Dimensions of pile hammer.....	15 inches between leads, 34 inches long.	Length 11 feet 8 inches; width 1 foot 7 inches.	15 inches between leads; 37 inches long.	15 by 20 by 42 inches.	1 foot 4 inches by 8 inches by 3 feet 5 inches.
22. Diameter of rope.....	1½ inches.	1-inch steel.	1½ inches.	1½ inch manila.	1-inch wire rope.
23. Type of steel hammer.....	Drop.	Warrington (Vulcan Iron Works).	Drop.	None.	None.
24. Size of jet pump.....		18 by 10 by 18 inches.		10 by 6 by 13 inch stroke.	Do.
25. Engine:					
(a) Make.....	Lidgerwood Manufacturing Co.	American Holst & Derrick Co.	Vulcan Iron Works.	Crooks.	Lidgerwood.
(b) Number of drums.....	1.	2.	1.	1.	2.
(c) Dimensions of cylinders.....	5 by 8 inches.	7 by 10 inches.	5 by 8 inches.	7 by 10 inches.	8 by 10 inches.
26. Boiler:					
(a) Height.....	90 inches.	7 feet 4 inches top of dome; 5 feet 5 inches top of shell.	82 inches.	14 feet length.	9 feet.
(b) Diameter.....	48 inches.	4 feet (outside of shell).	38 inches.	42 inches; four 10-inch flues.	3 feet 6 inches.
(c) Heating surface.....	205.43 square feet.	510 square feet.	171.83 square feet.	250 square feet.	51 square feet.
(d) Working steam pressure.....	100 pounds.	125 pounds.	100 pounds.	135 pounds.	100 pounds.

4829 .

Digitized by Google

TABLE X.—*Report of operations of pile drivers for the calendar year ending Dec. 31, 1916—Continued.*

1. Name.	No. 6.	No. 6.	VII-Y.	No. 9.	No. 10.
2. District.	Kansas City, Mo.	Mississippi River, first and second districts, Memphis, Tenn. ¹	Kansas City, Mo.	Mississippi River, first and second districts, Memphis, Tenn.	Duluth, Minn.
3. Where built.	Gasconade, Mo.	Cincinnati, Ohio.	St. Louis, Mo.	Cincinnati, Ohio. ¹	Superior Entry, Wis.
4. When built.	1914-15.	1894.	Rebuilt 1912.	1894.	1908-9.
5. Builder.	United States.	Samuel W. Coffin & Sons.	United States.	Samuel W. Coffin & Sons.	United States.
6. Time to build.	No record.	11 months.	2 months.	11 months.	3 months.
7. Material of hull.	Wood.	Wood.	Wood.	Wood.	Wood.
8. Cost of hull.	\$2,539.02.	Unknown.	\$2,800.	Unknown.	\$2,608.
9. Cost of machinery.	\$3,129.72.	Unknown.	\$4,050 (estimated).	Unknown.	\$1,428.
10. Total cost.	\$5,668.74.	\$2,217.50. ²	\$6,740.	\$2,217.50. ²	\$3,032.
11. Present value.	\$4,500.	800.	\$1,350.	800.	\$2,500.
12. Length.	75 feet.	70 feet.	75 feet.	70 feet.	65 feet.
13. Beam.	19 feet.	20 feet.	19 feet.	20 feet.	20 feet.
14. Depth.	4 feet 6 inches.	3 feet.	4 feet 4 inches.	3 feet.	3 feet 10 inches.
15. Draft forward.	1 foot 3 inches.	1 foot 6 inches.	2 feet 6 inches.	1 foot 6 inches.	2 feet 4 inches.
16. Draft aft.	1 foot 3 inches.	1 foot 6 inches.	2 feet 6 inches.	1 foot 6 inches.	1 foot 6 inches.
17. Displacement (long tons).	56.	57.	91.	57.	56.
18. Number of men in crew.	As grader, 6; as driver, 11.	6.	11.	6.	6.
19. Height of leaders.	55 feet 8 inches.	42 feet.	53 feet.	42 feet.	53 feet.
20. Weight of pile hammer.	6,700 pounds.	2,400 pounds.	5,500 pounds (estimated).	2,400 pounds.	3,534 pounds.
21. Dimensions of pile hammer.	Length, 11 feet 8 inches; width, 1 foot 7 inches.	15 by 20 by 42 inches.	Length, 9 feet 3 inches; width, 1 foot 7 inches.	15 by 20 by 42 inches.	6 feet long, 19 inches between heads.
22. Diameter of rope.	3-inch steel.	1½-inch manilla.	1-inch.	1½-inch manilla.	2 inches.
23. Type of steam hammer.	Wraggton (Vulcan Iron Works).	None.	Vulcan.	None.	None.
24. Size of jet pump.	18 by 10 by 18 inches.	10 by 6 by 12 inches.	None.	10 by 6 by 12 inches.	8 by 5 by 10 inches.
25. Engine.	American Holst & Derrick Co.	American Holst & Derrick Co.	American Holst & Derrick Co.	(Hooks, 1-drum trunk engine)	American hoist.
(a) Make.	American Holst & Derrick Co.	American Holst & Derrick Co.	American Holst & Derrick Co.	(Hooks, 1-drum trunk engine)	American hoist.
(b) Number of drums.	2.	2.	3.	1.	2.
(c) Dimensions of cylinders.	7 by 10 inches.	10 by 12 inches.	9 by 10 inches.	7 by 10 inches.	8½ by 10 inches.
26. Roller.	7 feet 4½ inches.	Wagner horizontal flue boiler, 14 feet long.	4 feet 8 inches.	L. M. Rumsey, St. Louis foot long.	101 inches.
(a) Height.	7 feet 4½ inches.	Wagner horizontal flue boiler, 14 feet long.	4 feet 8 inches.	L. M. Rumsey, St. Louis foot long.	101 inches.
(b) Diameter.	3 feet 9 inches (outside of shell).	44 inches, 4 flues, 12 inches diameter.	4 feet.	38 inches.	50 inches.
(c) Heating surface.	444 square feet.	292 square feet.	388 square feet.	244 square feet.	610 square feet.
(d) Working steam pressure.	125 pounds.	100 pounds allowed.	100 pounds.	100 pounds allowed.	115 pounds.

TABLE X.—*Report of operations of pile drivers for the calendar year ending Dec. 31, 1916.*—Continued.

No. 11.	No. 12.	No. 13.	No. 14.	No. 15.	No. 16.
1. Name.....	Montgomery, Ala.	St. Louis, Mo., Mississippi River Commission.	Kansas City, Mo.	Kansas City, Mo.	St. Louis, Mo.
2. District.....	Mobile, Ala.	Cincinnati, Ohio.	St. Louis, Mo.	St. Louis, Mo.	Do.
3. Where built.....	1907	1894	1893	1893	1893
4. When built.....	100 days	Wood	Wood	Wood	Geo. T. Nellies.
5. Builder.....	Gulf Dry Dock Co.	Wood	Wood	Wood	6 months.
6. Time to build.....	Wood (crossed)	No record	No record	No record	Wood.
7. Material of hull.....	Wood (crossed)	Wood	Wood	Wood	Wood.
8. Cost of hull.....	\$2,974	\$4,500	\$1,980	\$1,500	\$1,500
9. Cost of machinery.....	No record	\$2,270	\$2,000 (old machinery used)	\$2,000	\$2,000
10. Total cost.....	No record	\$6,770	\$4,500	\$3,500	\$3,500
11. Present value.....	\$1,600	66 feet	70 feet	\$2,000	\$1,700
12. Length.....	30 feet	20 feet	19 feet	20 feet	68 feet
13. Beam.....	22 feet	3 feet 6 inches	4 feet 4 inches	3 feet 1 1/2 inches	20 feet
14. Depth.....	4 feet 2 inches	1 foot 11 inches	2 feet 4 inches	2 feet 1 1/2 inches	3 feet 1 1/2 inches
15. Draft forward.....	8 inches	1 foot 2 inches	2 feet 5 inches	2 feet	2 feet
16. Draft aft.....	1 foot 5 inches	54	54	75	75
17. Displacement (long tons).....	30	5	9	8	8
18. Number of men in crew.....	9	42 feet	56 feet 2 inches	42 feet	42 feet
19. Height of leaders.....	36 feet	3,200 pounds	6,500 pounds	2,400 pounds	2,400 pounds
20. Weight of pile hammer.....	1,500 pounds	8 1/2 by 10 1/2 by 42 inches	Length, 9 feet 3 inches; width, 1 foot 7 inches.	15 by 20 by 42 inches	15 by 20 by 42 inches.
21. Dimensions of pile hammer.....	3 feet long, 20 inches wide	1 1/2 inches	3 inch	14-inch manila	14-inch manila.
22. Diameter of rope.....	1 1/2 inches	Drop hammer	Vulcan.	None	None
23. Type of steam hammer.....	None	7-inch steam by 4 1/2 water by 8-inch stroke.		12 by 7 by 16 inch stroke	12 by 7 by 16 inch stroke.
24. Size of jet pump.....	8-inch stroke.				
25. Engine:					
(a) Make.....	Lidgerwood Manufacturing Co.	Cochran, Atsile & Thurman.	Lidgerwood Manufacturing Co.	Mundy	Mundy.
(b) Number of drums.....	2	1 double cylinder, single friction.	2	1	1.
(c) Dimensions of cylinder.....	6 1/2 inches diameter by 6-inch stroke.	6 by 12 inches	7 1/2 by 10 inches	6 1/2 by 12 inches	6 1/2 by 13 inches.
26. Boiler:					
(a) Height.....	7 feet 6 inches	18 feet long.	5 feet 6 inches	18 feet long.	18 feet long.
(b) Diameter.....	3 feet 6 inches	36 inches	4 feet.	36 inches	36 inches; two 13-inch flues.
(c) Heating surface.....	218 square feet	241 square feet.	450 square feet.	220 square feet.	220 square feet.
(d) Working steam pressure.....	100 pounds	100 pounds.	100 pounds.	133 pounds.	135 pounds.

[illegible]

TABLE X.—*Report of operations of pile drivers for the calendar year ending Dec. 31, 1916—Continued.*

1. Name.....	No. 28.	No. 29.	No. 30.	No. 31.	No. 32.
2. District.....	St. Louis, Mo.	St. Louis, Mo.	St. Louis, Mo.	St. Louis, Mo.	St. Louis, Mo.
3. Where built.....	1893. do.	1893. do.	1893. do.	1893. do.	1893. do.
4. When built.....	1893.	1893.	1893.	1893.	1893.
5. Builder.....	Geo. T. Nelles.	Geo. T. Nelles.	Geo. T. Nelles.	Geo. T. Nelles.	Geo. T. Nelles.
6. Time to build.....	6 months.	6 months.	6 months.	6 months.	6 months.
7. Materials of hull.....	Wood.	Wood.	Wood.	Wood.	Wood.
8. Cost of hull.....	\$1,500.	\$1,500.	\$1,500.	\$1,500.	\$1,500.
9. Cost of machinery.....	\$2,080.	\$2,080.	\$2,080.	\$2,080.	\$2,080.
10. Total cost.....	\$3,580.	\$3,580.	\$3,580.	\$3,580.	\$3,580.
11. Present value.....	\$1,700.	\$1,700.	\$1,700.	\$1,700.	\$1,700.
12. Length.....	68 feet.	68 feet.	68 feet.	68 feet.	68 feet.
13. Beam.....	20 feet.	20 feet.	20 feet.	20 feet.	20 feet.
14. Depth.....	3 feet 1½ inches.	3 feet 1½ inches.	3 feet 1½ inches.	3 feet 1½ inches.	3 feet 1½ inches.
15. Draft forward.....	2 feet.	2 feet.	2 feet.	2 feet.	2 feet.
16. Draft aft.....	2 feet.	2 feet.	2 feet.	2 feet.	2 feet.
17. Displacement (long tons).....	75.	75.	75.	75.	75.
18. Number of men in crew.....	8.	8.	8.	8.	8.
19. Height of leaders.....	42 feet.	42 feet.	42 feet.	42 feet.	42 feet.
20. Weight of pile hammer.....	2,400 pounds.	2,400 pounds.	2,400 pounds.	2,400 pounds.	2,400 pounds.
21. Dimensions of pile hammer.....	15 by 20 by 42 inches.	15 by 20 by 42 inches.	15 by 20 by 42 inches.	15 by 20 by 42 inches.	15 by 20 by 42 inches.
22. Diameter of rope.....	1½-inch manilla.	1½-inch manilla.	1½-inch manilla.	1½-inch manilla.	1½-inch manilla.
23. Type of steam hammer.....	None.	None.	None.	None.	None.
24. Size of jet pump.....	Hooker, No. 12, 12 by 7 by 16 inches.	12 by 7 by 16 inch stroke.	12 by 7 by 16 inch stroke.	12 by 7 by 16 inch stroke.	12 by 7 by 16 inch stroke.
25. Engine:					
(a) Make.....	Mundy.	Mundy.	Mundy.	Mundy.	Mundy.
(b) Number of drums.....	1.	1.	1.	1.	1.
(c) Dimensions of cylinders.....	6½ by 12 inches.	6½ by 12 inches.	6½ by 12 inches.	6½ by 12 inches.	6½ by 12 inches.
26. Boiler:					
(a) Height.....	18 feet.	18 feet.	18 feet.	18 feet.	18 feet.
(b) Diameter.....	36 inches; two 12-inch flues.	36 inches; two 12-inch flues.	36 inches; two 12-inch flues.	36 inches; two 12-inch flues.	36 inches; two 12-inch flues.
(c) Heating surface.....	220 square feet.	220 square feet.	220 square feet.	220 square feet.	220 square feet.
(d) Working steam pressure.....	135 pounds.	135 pounds.	135 pounds.	135 pounds.	135 pounds.

FLOATING PLANT.

4835

OPERATING COST.

27. Pay roll.....					
28. Supplies.....					
29. Repairs.....					
(a) Hull.....					
(b) Machinery.....					
30. Miscellaneous.....					
Total cost.....	\$129.77	\$1,453.27	\$1.42	\$304.95	\$1,290.56
31. Work done during year and where operated.....	See Remarks.	See Remarks.	See Remarks.	See Remarks.	See Remarks.
32. Number of days worked during year.	Remarks.	Remarks.	Remarks.	Remarks.	Remarks.
	Mississippi River between mouths of Ohio and Missouri Rivers. Not in commission during the year.	Mississippi River between mouths of Ohio and Missouri Rivers. Not in commission during the year.	Mississippi River between mouths of Ohio and Missouri Rivers. Not in commission during the year.	Mississippi River between mouths of Ohio and Missouri Rivers. Not in commission during the year.	Mississippi River between mouths of Ohio and Missouri Rivers. Not in commission during the year.
	Mississippi River between mouths of Ohio and Missouri Rivers. Piles driven, 415; clumps cabled, 121; stringers placed and cabled, 37; disk anchors sunk and removed, 25. Eleven days additional on miscellaneous work.	Mississippi River between mouths of Ohio and Missouri Rivers. Piles driven, 415; clumps cabled, 121; stringers placed and cabled, 37; disk anchors sunk and removed, 25. Eleven days additional on miscellaneous work.	Mississippi River between mouths of Ohio and Missouri Rivers. Piles driven, 84; clumps cabled, 23; stringers placed and cabled, 18. Seven days crew working on stone and other work.	Mississippi River between mouths of Ohio and Missouri Rivers. Piles driven, 486; clumps cabled, 137; stringers placed and cabled, 28. Four days crew working on stone and other work.	Mississippi River between mouths of Ohio and Missouri Rivers. Piles driven, 486; clumps cabled, 137; stringers placed and cabled, 28. Four days crew working on stone and other work.
	77.	77.	23.	70.	70.

TABLE X.—*Report of operations of pile drivers for the calendar year ending Dec. 31, 1916—Continued.*

No. 33.	No. 34.	No. 35.	No. 101.
1. Name.....	St. Louis, Mo.	St. Louis, Mo.	St. Louis, Mo.
2. District.....	do.	do.	do.
3. Where built.....	1863.	1863.	1912-13.
4. When built.....	Geo. T. Nelles.	Geo. T. Nelles.	American Bridge Co. of New York.
5. Builder.....	6 months.	6 months.	12 months.
6. Time to build.....	Wood.	Wood.	Steel.
7. Material of hull.....	\$1,500.	\$1,500.	\$4,350.
8. Cost of hull.....	\$2,090.	\$2,090.	\$4,273.43.
9. Cost of machinery.....	Not known.	Not known.	
10. Total cost.....	Transferred from pile driver No. 73.	Transferred from pile driver No. 73.	
11. Present value.....	\$1,400.31.	\$3,590.	\$3,722.43.
12. Length.....	\$1,700.	\$2,000.	\$6,800.
13. Beam.....	66 feet.	68 feet.	88 feet.
14. Depth.....	18 feet.	20 feet.	25 feet.
15. Draught forward.....	3 feet 14 inches.	3 feet 14 inches.	4 feet 6 inches.
16. Draught aft.....	1 foot 8 inches.	2 feet.	2 feet.
17. Displacement (long tons).....	1 foot 8 inches.	2 feet.	2 feet.
18. Number of men in crew.....	47.	76.	106.
19. Height of leaders.....	8.	8.	8.
20. Weight of pile hammer.....	39.8 feet.	42 feet.	56 feet.
21. Dimensions of pile hammer.....	2,400 pounds.	2,400 pounds.	6,500 pounds; hammer proper 3,000 pounds.
22. Diameter of rope.....	15 by 20 by 42 inches.	15 by 20 by 42 inches.	Cylinder 104 by 36 inches.
23. Type of steam hammer.....	14-inch manila.	14-inch manila.	4-inch wire.
24. Size of jet pump.....	None.	None.	Vulcan No. 2.
25. Engine.....	12 by 7 by 16 inch stroke.	12 by 7 by 16 inch stroke.	10 by 6 by 10 inch stroke.
(a) Make.....	Unknown.	Unknown.	Mundy.
(b) Number of drums.....	2.	1.	1.
(c) Dimensions of cylinders.....	Idlgewood.	Idlgewood.	Mundy.
26. Boiler.....	64 by 12 inches.	64 by 12 inches.	64 by 12 inches.
(a) Height.....	18-foot length.	18-foot length.	18-foot length.
(b) Diameter.....	36 inches; two 12-inch flues.	36 inches; two 12-inch flues.	36 inches; two 12-inch flues.
(c) Heating surface.....	Unknown.	Unknown.	220 square feet.
(d) Working steam pressure.....	100 pounds.	133 pounds.	133 pounds.

4337.

Digitized by Google

TABLE X.—Report of operations of pile drivers for the calendar year ending Dec. 31, 1916—Continued.

1. Name.....	No. 102.	No. 103.	No. 104.	No. 551.
2. District.....	St. Louis, Mo.	St. Louis, Mo.	St. Louis, Mo.	Kansas City, Mo.
3. Where built.....	Ambridge, Pa.	Ambridge, Pa.	Ambridge, Pa.	St. Louis, Mo.
4. When built.....	1912-13.	1912-13.	1912-13.	1913.
5. Builder.....	American Bridge Co. of New York.	American Bridge Co. of New York.	American Bridge Co. of New York.	United States.
6. Time to build.....	12 months.	12 months.	12 months.	1 year.
7. Material of hull.....	Steel.	Steel.	Steel.	Wood.
8. Cost of hull.....	\$4,350.	\$4,350.	\$4,350.	\$3,000 (estimated).
9. Cost of machinery.....	\$4,372.44.	\$4,372.44.	\$4,372.44.	\$2,892.
10. Total cost.....	\$8,722.44.	\$8,722.44.	\$8,722.44.	\$5,892.
11. Present value.....	\$5,900.	\$5,900.	\$5,900.	\$3,000.
12. Length.....	88 feet.	88 feet.	88 feet.	76 feet.
13. Beam.....	25 feet.	25 feet.	25 feet.	19 feet.
14. Depth.....	4 feet 6 inches.	4 feet 6 inches.	4 feet 6 inches.	4 feet 4 inches.
15. Draft (aft).....	2 feet.	2 feet 2 inches.	2 feet 2 inches.	1 foot 6 inches.
16. Draft (st).....	2 feet.	2 feet 2 inches.	2 feet 2 inches.	1 foot 6 inches.
17. Displacement (long tons).....	106.	106.	106.	60.
18. Number of men in crew.....	8.	7.	7.	As grader, 6; as driver, 11.
19. Height of leaders.....	58 feet.	58 feet.	58 feet.	50 feet.
20. Weight of pile hammer.....	10,000 pounds; hammer proper, 5,000 pounds.	12,000 pounds.	12,000 pounds.	6,500 pounds.
21. Dimensions of pile hammer.....	Cylinder, 13½ by 49 inches.	20½ by 20½ by 58 inches.	20½ by 20½ by 58 inches.	Length, 9 feet 4 inches; width, 1 foot 6½ inches.
22. Diameter of rope.....	1-inch wire.	1-inch wire.	1-inch wire.	1-inch steel.
23. Type of steam hammer.....	Vulcan No. 1.	Cran.	Cran.	Vulcan.
24. Size of jet pump.....	10 by 8 by 10 inches.	Duplex, 10 by 6 by 10 inches.	Duplex, 10 by 6 by 10 inch stroke.	12 by 7 by 10 inches, Duplex.
25. Engine:				
(a) Make.....	Mundy.	Mundy.	Mundy.	American Holst & Derrick Co.
(b) Number of drums.....	1.	1.	1.	2.
(c) Dimensions of cylinders.....	6½ by 12 inches.	8 by 10 inches.	8 by 10 inches.	6½ by 10 inches.
26. Boiler:				
(a) Height.....	18 feet length.	18 feet length.	18 feet length.	16 feet 3 inches (horizontal).
(b) Diameter.....	38 inches.	38 inches.	38 inches.	4 feet.
(c) Heating surface.....	220 square feet.	200 square feet.	200 square feet.	406 square feet.
(d) Working steam pressure.....	130 pounds.	130 pounds.	130 pounds.	100 pounds.

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 84

OPERATING COST

Digitized by Google

TABLE X.—Report of operations of pile drivers for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name..... | No. 102. | No. 103. | No. 104. | No. 551. |
|------------------------------------|---|----------------------------------|------------------------------------|--|
| 2. District..... | St. Louis, Mo. | St. Louis, Mo. | St. Louis, Mo. | Kansas City, Mo. |
| 3. Where built..... | Ambridge, Pa. | Ambridge, Pa. | Ambridge, Pa. | St. Louis, Mo. |
| 4. When built..... | 1912-13. | 1912-13. | 1912-13. | 1913. |
| 5. Builder..... | American Bridge Co. of New York. | American Bridge Co. of New York. | American Bridge Co. of New York. | United States. |
| 6. Time to build..... | 12 months. | 12 months. | 12 months. | 1 year. |
| 7. Material of hull..... | Steel. | Steel. | Steel. | Wood. |
| 8. Cost of hull..... | \$4,350. | \$4,350. | \$4,350. | \$3,000 (estimated). |
| 9. Cost of machinery..... | \$4,372.44. | \$4,372.44. | \$4,372.44. | \$2,892. |
| 10. Total cost..... | \$8,722.44. | \$8,722.44. | \$8,722.44. | \$5,892. |
| 11. Present value..... | \$5,900. | \$6,900. | \$6,900. | \$3,000. |
| 12. Length..... | 88 feet. | 88 feet. | 88 feet. | 76 feet. |
| 13. Beam..... | 25 feet. | 25 feet. | 25 feet. | 19 feet. |
| 14. Depth..... | 4 feet 6 inches. | 4 feet 6 inches. | 4 feet 6 inches. | 4 feet 4 inches. |
| 15. Draft forward..... | 2 feet. | 2 feet 2 inches. | 2 feet 2 inches. | 1 foot 6 inches. |
| 16. Draft aft..... | 2 feet. | 2 feet 2 inches. | 2 feet 2 inches. | 1 foot 6 inches. |
| 17. Displacement (long tons)..... | 106. | 106. | 106. | 60. |
| 18. Number of men in crew..... | 8. | 7. | 7. | As grader, 6; as driver, 11. |
| 19. Height of leaders..... | 56 feet. | 58 feet. | 58 feet. | 50 feet. |
| 20. Weight of pile hammer..... | 10,000 pounds; hammer proper, 5,000 pounds. | 12,000 pounds. | 12,000 pounds. | 6,500 pounds. |
| 21. Dimensions of pile hammer..... | Cylinder, 13½ by 42 inches. | 20½ by 20½ by 58 inches. | 20½ by 20½ by 58 inches. | Length, 9 feet 4 inches; width, 1 foot 6 inches. |
| 22. Diameter of rope..... | 1-inch wire. | 1-inch wire. | 1-inch wire. | 1-inch steel. |
| 23. Type of steam hammer..... | Vulcan No. 1. | Cram. | Cram. | Vulcan. |
| 24. Size of jet pump..... | 10 by 6 by 10 inches. | Duplex, 10 by 6 by 10 inches. | Duplex, 10 by 6 by 10 inch stroke. | 12 by 7 by 10 inches, Duplex. |
| 25. Engine: | | | | |
| (a) Make..... | Mundy. | Mundy. | Mundy. | American Hoist & Derrick Co. |
| (b) Number of drums..... | 1. | 1. | 1. | 2. |
| (c) Dimensions of cylinders..... | 6½ by 12 inches. | 8 by 10 inches. | 8 by 10 inches. | 6½ by 10 inches. |
| 26. Boiler: | | | | |
| (a) Height..... | 18 feet length. | 18 feet length. | 18 feet length. | 16 feet 3 inches (horizontal). |
| (b) Diameter..... | 36 inches. | 36 inches. | 36 inches. | 4 feet. |
| (c) Heating surface..... | 220 square feet. | 200 square feet. | 200 square feet. | 406 square feet. |
| (d) Working steam pressure..... | 135 pounds. | 135 pounds. | 135 pounds. | 100 pounds. |

[illegible]Digitized by Google

TABLE X.—*Report of operations of pile drivers for the calendar year ending Dec. 31, 1916—Continued.*

| 1. Name..... | No. 871. | No. 981. | No. 982. | No. 983. |
|------------------------------------|---|---|---|---|
| 2. District..... | St. Louis, Mo., Mississippi River Commission, Cincinnati, Ohio..... 1897. | St. Louis, Mo., Mississippi River Commission, Cincinnati, Ohio..... 1898. | St. Louis, Mo., Mississippi River Commission, Cincinnati, Ohio..... 1898. | St. Louis, Mo., Mississippi River Commission, Cincinnati, Ohio..... 1898. |
| 3. Where built..... | Wood..... | Wood..... | Wood..... | Wood..... |
| 4. When built..... | ..... | ..... | ..... | ..... |
| 5. Builder..... | ..... | ..... | ..... | ..... |
| 6. Time to build..... | ..... | ..... | ..... | ..... |
| 7. Material of hull..... | ..... | ..... | ..... | ..... |
| 8. Cost of hull..... | ..... | ..... | ..... | ..... |
| 9. Cost of machinery..... | ..... | ..... | ..... | ..... |
| 10. Total cost..... | \$2,165..... | \$2,384 (approximate)..... | \$2,384 (approximate)..... | \$2,384 (approximate)..... |
| 11. Present value..... | \$500..... | \$1,160..... | \$500..... | \$1,700..... |
| 12. Length..... | 76 feet..... | 76 feet..... | 76 feet..... | 76 feet..... |
| 13. Beam..... | 25 feet..... | 25 feet..... | 25 feet..... | 25 feet..... |
| 14. Depth..... | 3 feet 10 inches..... | 3 feet 10 inches..... | 3 feet 10 inches..... | 3 feet 10 inches..... |
| 15. Draft forward..... | 1 foot 4 inches..... | 1 foot 4 inches..... | 1 foot 4 inches..... | 1 foot 4 inches..... |
| 16. Draft aft..... | 9 1/2 inches..... | 9 1/2 inches..... | 9 1/2 inches..... | 9 1/2 inches..... |
| 17. Displacement (long tons)..... | 5..... | 5..... | 5..... | 5..... |
| 18. Number of men in crew..... | ..... | ..... | ..... | ..... |
| 19. Height of leaders..... | 44 feet..... | 42 feet..... | 44 feet..... | 44 feet..... |
| 20. Weight of pile hammer..... | 2,200 pounds..... | None used..... | 2,200 pounds..... | 2,200 pounds..... |
| 21. Dimensions of pile hammer..... | 8 1/2 by 19 1/2 by 26 inches..... | 8 1/2 by 19 1/2 by 26 inches..... | 8 1/2 by 19 1/2 by 26 inches..... | 8 1/2 by 19 1/2 by 26 inches..... |
| 22. Diameter of rope..... | 1 1/2 inches..... | 1 1/2 inches..... | 1 1/2 inches..... | 1 1/2 inches..... |
| 23. Type of steam hammer..... | Drop hammer..... | None used..... | Drop hammer..... | Drop hammer..... |
| 24. Size of jet pump..... | ..... | ..... | ..... | ..... |
| 25. Engine..... | (a) Kate..... | J. S. Mundy..... | Cochran, Ainsie & Thurman..... | Cochran, Ainsie & Thurman..... |
| (b) Number of drums..... | 1..... | 2..... | 1..... | 1..... |
| (c) Dimensions of cylinder..... | 6 by 12 inches..... | 7 by 12 inches..... | 6 by 12 inches..... | 6 by 12 inches..... |
| 26. Boiler..... | (a) Height..... | 12 feet 8 1/2 inches long..... | 12 feet 8 1/2 inches..... | 12 feet 8 1/2 inches..... |
| (b) Diameter..... | 40 inches..... | 40 inches..... | 40 inches..... | 40 inches..... |
| (c) Heating surface..... | 270 square feet..... | 270 square feet..... | 270 square feet..... | 270 square feet..... |
| (d) Working steam pressure..... | 100 pounds..... | 100 pounds..... | 100 pounds..... | 100 pounds..... |

OPERATING COST.

| | | | | | |
|---|---|---|---|--|------------|
| 27. Pay roll..... | | | | | |
| 28. Supplies..... | | | | | |
| 29. Repairs: | | | | | |
| (a) Hull..... | | | | | |
| (b) Machinery..... | \$253.14 | | | | |
| 30. Miscellaneous..... | | | | | |
| Total cost..... | \$253.14 | \$694.83 | \$477.84 | | \$1,224.00 |
| 31. Work done during year and where operated. | Sinking and pulling piles, Ohio River below Paducah. ¹ | | | | |
| 33. Number of days worked during year. | 66 days on Ohio River. | | | | |
| | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | |
| | ¹ Used also to furnish steam at dredge fleet, West Memphis, Ark. | Used to furnish steam at dredge fleet, West Memphis, Ark. | Used to furnish steam at dredge fleet, West Memphis, Ark. | Used to furnish steam for sand blasting outfit at dredge fleet, West Memphis, Ark. | |

TABLE XI.

HYDRAULIC GRADERS.

4343

TABLE XI.—*Report of operations of hydraulic graders for the calendar year ending Dec. 31, 1916.*

| 1. Name..... | No. 1. | No. 2. | No. 3. | 101. |
|--|---|--|---|-----------------------------------|
| 2. District..... | New Orleans (fourth, Mississippi River) | Mississippi River, first and second districts, Memphis, Tenn.) | New Orleans (fourth, Mississippi River) | St. Louis, Mo. |
| 3. Where built..... | New Orleans, La. | New Albany, Ind. | New Orleans, La. | Ambridge, Pa. |
| 4. When built..... | 1901 | 1882 | 1910 | 1912-13. |
| 5. Builder..... | U. S. Engineers. | Unknown. | U. S. Engineers. | American Bridge Co., of New York. |
| 6. Time to build..... | 5 months. | do. | 5 months. | 12 months. |
| 7. Material of hull..... | Cresoted wood. | Wood. | Cresoted wood. | Steel. |
| 8. Cost of hull..... | \$11,217. | Unknown. | \$10,650.38. | \$4,350. |
| 9. Cost of machinery..... | \$12,653. | do. | \$13,561.75. | \$9,340.02. |
| 10. Total cost..... | \$23,870. | \$30,232. | \$24,212.13. | \$13,690.02. |
| 11. Length..... | 124 feet. | 110 feet. | 124 feet. | 88 feet. |
| 12. Beam..... | 30 feet. | 30 feet. | 30 feet. | 25 feet. |
| 13. Depth..... | 7 feet 7 inches. | 5 feet. | 7 feet 7 inches. | 4 feet 6 inches. |
| 14. Draft forward..... | 3 feet. | 1 foot 8 inches. | 3 feet. | 2 feet 4 inches. |
| 15. Draft aft..... | 3 feet. | 1 foot 8 inches. | 3 feet. | 2 feet 4 inches. |
| 16. Displacement..... | 280 tons. | 150 long tons. | 280 tons. | 126 tons. |
| 17. Number of men in crew..... | 20. | 20. | 20. | 11. |
| MACHINERY. | | | | |
| 18. Boilers: | | | | |
| (a) Number and type..... | 1 Heine safety. | Boilers dismantled. | 1 Heine safety. | 2 Mississippi River. |
| (b) Diameter..... | 9 feet 8 inches. | | 9 feet 8 inches. | 42 inches, four 9½-inch flues. |
| (c) Length..... | 17 feet. | | 17 feet. | 14 feet. |
| (d) Total heating surface..... | 2,225 square feet. | | 2,225 square feet. | 500 square feet. |
| (e) Total grate surface..... | 45 square feet. | | 45 square feet. | 35 square feet. |
| (f) Average pounds of coal burned per square foot of grate per hour..... | 4.166. | | 7.21. | 28. |
| (g) Steam pressure..... | 150 pounds. | | 150 pounds. | 135 pounds. |
| (h) How driven..... | Direct acting, duplex. | Direct acting, compound duplex pump. | Direct acting, duplex. | Belted to Ideal steam engine. |
| (b) Dimensions of cylinders or turbine..... | 12 and 20 by 15 inches stroke. | 18 by 34 by 24 inches. | 12 and 20 by 15 inches stroke. | 15 inches by 14 inches stroke. |
| (c) Make..... | Henry R. Worthington. | Dean Steam Pump Co. | Henry R. Worthington. | American Well Works. |
| (d) Indicated horsepower..... | Engine not indicated. | Unknown. | Engines not indicated. | 200. |
| (e) Revolutions per minute..... | 30 strokes. | 20 strokes. | 30 strokes. | 200. |
| (f) Make of pump..... | Henry R. Worthington. | | Henry R. Worthington. | American Well Works. |
| (g) Diameter of piston..... | 12 by 15 inches. | 12 inches. | 12 by 15 inches. | 20 inches diameter of runner. |
| (h) Diameter of discharge..... | 16 inches. | 12 inches. | 16 inches. | 7 inches. |
| (i) Number of stages..... | 1. | 1. | 10 inches. | 4. |
| (k) Revolutions per minute..... | 30. | 25 strokes. | 30 strokes. | 1,160. |

| | | | | |
|---|---|--------------------------------------|---|-------------------------------------|
| (1) Total head..... | 492 | 480 feet..... | 482 feet..... | 340 feet..... |
| (2) Capacity in gallons per minute..... | 1,000 | 400..... | 1,000..... | 760..... |
| (3) Number of nozzles..... | 1 to 2..... | 1 to 2..... | 1 to 2..... | 2 inch..... |
| (4) Size of hose nozzle..... | 1 to 1½ inches..... | 1 to 1½ inches..... | 1 to 1½ inches..... | 1 to 1½ inches..... |
| 20. Condenser: | | | | None. |
| (a) Diameter and length..... | 35 by 82 inches..... | | 35 by 82 inches..... | |
| (b) No. of tubes..... | 8..... | | 8..... | |
| (c) Cooling surface..... | 450 square feet..... | Jet..... | 450 square feet..... | |
| (d) Vacuum..... | 24 inches..... | | 24 inches..... | |
| 21. Air pump: | | | | Do. |
| (a) Make..... | Blake..... | None..... | Blake..... | |
| (b) Size..... | 6 by 10 by 12 inches..... | | 6 by 10 by 12 inches..... | |
| (c) Strokes per minute..... | 18..... | | 18..... | |
| 22. Circulating pump: | | | | Do. |
| (a) Make..... | (1)..... | | (1)..... | |
| (b) Size..... | | Dean Steam Pump Co..... | | |
| (c) Revolutions per minute..... | | 12 by 18 by 22 inches..... | | |
| 23. Feed pump: | | | | |
| (a) Make..... | Henry R. Worthington..... | Dismantled..... | Henry R. Worthington..... | Hooker..... |
| (b) Size..... | 4½ by 2½ by 4 inches..... | | 6 by 4 by 6 inches..... | 5 by 3 by 8 inches stroke. |
| 24. Feed heater: | | | | U. S. Engineer Depot. |
| (a) Make..... | Henry R. Worthington..... | United States..... | Henry R. Worthington..... | 18 inches by 6 feet length. |
| (b) Diameter and height..... | 12 inches diameter, 90 inches long..... | 16 inches diameter, 5 feet long..... | 12 inches diameter, 96 inches long..... | |
| (c) Heating surface..... | 150 square feet..... | | 150 square feet..... | 2½ square feet. |
| (d) Temperature of feed water..... | 145° F..... | | 145° F..... | 150° F..... |
| (e) Temperature of supply..... | 90° F..... | | 90° F..... | 30° to 70° F., according to season. |
| OPERATIONS. | | | | |
| 25. Total number of hours pumping..... | 632 | | 1,320 | |
| 26. Number of cubic yards graded per hour..... | 173 | | 163 | |
| 27. Number of cubic yards graded per day..... | 2,300 | | 2,608 (16 hours per day)..... | |
| 28. Total number of cubic yards graded during year..... | 112,654 | | 215,463 | |
| 29. Number of linear feet of bank grading done during year..... | 3,049 | | 7,635 | |
| COST OF WORK. | | | | |
| 30. Pay roll..... | \$2,673.85 | | \$5,928.15 | \$653.22 |
| 31. Subistence..... | \$2,408.51 | | 2,000.66 | 212.00 |
| 32. Supplies: | | | | |
| (a) Machinery..... | \$2.00 | | 65.00 | 8.76 |
| (b) Outfit..... | | | 1,081.75 | |
| 33. Coal..... | 282.40 | | 2,089.91 | 110.00 |
| 34. Miscellaneous..... | | | 18.58 | 4.10 |

TABLE XI.—Report of operations of hydraulic graders for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name. | No. 1. | No. 2. | No. 2. | 101. ¹ |
|---|---|---|--|--|
| COST OF WORK—continued. | | | | |
| 35. Repair: | | | | |
| (a) Haul..... | \$428.60 | | | \$146.00 |
| (b) Machinery..... | 686.00 | | \$369.00 | 228.13 |
| 36. Office expenses..... | | | | |
| 37. Surveys..... | | | | |
| 38. Incidentals..... | | | | |
| 39. Grand total..... | \$4,218.80 | | \$11,493.11 | \$1,382.21 |
| 40. Total cost per cubic yard..... | \$0.0375 | | Field cost, \$0.053 | |
| 41. Number of tons of coal used and cost per ton. | 73.1 tons at \$4. | | 430 tons, at \$4.80 | 46.8 tons, at \$2.35. |
| | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> |
| | <p>1 Condenser in suction pipe main pump.</p> <p>With the exception of boiler, all working parts of grader are in duplicate. Two main pumps, two air pumps, two boiler-feed pumps, two condensers, etc. Description is for one of each. Two nozzles are ordinarily operated, one from each main pump.</p> | <p>This grader is in an unserviceable condition. Boilers and feed pump have been removed.</p> | <p>In Hard Times, Kempe, Giles, and Marango built.</p> <p>With the exception of boiler, all working parts of grader are in duplicate. Two main pumps, two air pumps, two boiler-feed pumps, two condensers, etc. Description is for one of each. Two nozzles are ordinarily operated, one from each main pump.</p> <p>1 Condenser in suction pipe main pump.</p> | <p>Mississippi River between mouths Ohio and Missouri</p> <p>2,983 cubic yards stone unloaded for paving bank, 888 cubic bushels coal unloaded.</p> <p>1 Grader fitted with derrick as follows: Mast, (a) height, 12 feet; (b) dimensions, wood, 15-inch bottom, 9-inch top; Boom, (a) length, 58 feet; (b) dimensions, wood, 15-inch bottom, 9-inch top; (c) how braced, not braced; (d) capacity in tons, 2. Bull wheel, diameter, 12 feet. Bucket, (a) type, wooden box; (b) capacity, 1½ cubic yards. Hoisting engine, (a) make, Ottumwa; (b) number of cylinders, 2; (c) dimensions of cylinders, 7 by 10 inches stroke; (d) diameter of rope, 1½ inches. Swinging engine, (a) make, Lister; (b) dimensions of cylinders, 5 by 6 inches stroke; (d) diameter of rope, 1 inch.</p> |

| No. 109. | No. 1011. | No. 1012. | No. 1013. |
|--|--|--|---|
| 1. Name..... | Third, Mississippi River.
Hull, Ambridge, Pa.; machinery installed at Vicksburg.
Hull, 1910; machinery, 1911 and 1914. | Third, Mississippi River.
Hull, Ambridge, Pa.
Hull, 1910; machinery, 1911 and 1914. | Third, Mississippi River.
Hull, Ambridge, Pa.; machinery installed at Vicksburg.
Hull, 1910; machinery, 1911 and 1914. |
| 2. District..... | St. Louis, Mo.
Ambridge, Pa. | Third, Mississippi River.
Hull, Ambridge, Pa. | Third, Mississippi River.
Hull, Ambridge, Pa. |
| 3. Where built..... | 1912-13.
American Bridge Co., of New York. | Hull, 1910; machinery, 1911.
Hull, American Bridge Co., Ambridge, Pa. | Hull, 1910; machinery, 1911 and 1914. |
| 4. When built..... | 12 months. | Hull, 8 months; machinery, 6 months. | Hull, 8 months; machinery, 6 months. |
| 5. Builder..... | Steel.
\$4,350.
\$2,340.03.
\$13,600.03.
\$85,000.
25 feet.
25 feet.
4 feet 6 inches.
2 feet 4 inches.
2 feet 4 inches.
126 tons.
11. | Steel.
\$6,400.
\$21,888.13.
\$31,288.13.
120 feet.
30 feet.
6 feet.
2 feet 7 inches.
2 feet 6 inches.
229.46 long tons.
Single, 18; double, 31. | Steel.
\$8,300.
\$16,700.
\$25,000.
120 feet.
30 feet.
6 feet.
2 feet 6 inches.
2 feet 6 inches.
222.4 long tons.
Single, 18; double, 31. |
| 6. Time to build..... | | | |
| 7. Material of hull..... | | | |
| 8. Cost of hull..... | | | |
| 9. Cost of machinery..... | | | |
| 10. Total cost..... | | | |
| 11. Length..... | | | |
| 12. Beam..... | | | |
| 13. Depth..... | | | |
| 14. Draft forward..... | | | |
| 15. Draft aft..... | | | |
| 16. Displacement..... | | | |
| 17. Number of men in crew..... | | | |
| MACHINERY. | | | |
| 18. Boilers: | | | |
| (a) Number and type..... | 2 Scotch marine (Clyde type). | 2 Scotch marine (Clyde type). | 1 Scotch marine (Clyde type). |
| (b) Diameter..... | 42 inches, twelve 6-inch flues. | 7 feet 8 inches. | 20 inches. |
| (c) Length..... | 15 feet. | 17 feet 4 inches. | 12 feet. |
| (d) Total heating surface..... | 712 square feet. | 2,500 square feet. | 1,575 square feet. |
| (e) Total grate surface..... | 40 square feet. | 54 square feet. | 49 square feet. |
| (f) Average pounds of coal burned per square foot of grate per hour..... | 28. | 14.8. | 20. |
| (g) Steam pressure..... | 145 pounds. | 150 pounds. | 160 pounds. |
| 19. Pump: | | | |
| (a) How driven..... | Belted to Ideal steam engine. | Steam turbine. | Direct connected steam turbine. |
| (b) Dimensions of cylinders or turbine..... | 15 by 14 inch stroke. | 24 inches, 7 stages. | 42 by 36 inches. |
| (c) Maker..... | American Well Works. | Kerr Turbine Co. | Kerr Turbine Co., Wellsville, N. Y. |
| (d) Indicated horsepower..... | 200. | 150 at 150 pounds pressure. | 225 at 150 pounds steam pressure. |
| (e) Revolutions per minute..... | 280. | 1,900. | 1,300. |
| (f) Make of pump..... | American Well Works. | Alberger Pump Co. | Henry R. Worthington. |
| (g) Size..... | 20 inches diameter of runner. | 20 inches. | 30 inches diameter. |
| (h) Diameter of suction..... | 7 inches. | 6 inches. | 9 inches. |
| (i) Diameter of discharge..... | 6 inches. | 5 inches. | 8 inches. |
| (j) Number of stages..... | 4. | 4. | 2. |
| (k) Revolutions per minute..... | 1,150. | 1,900. | 1,300. |
| (l) Total head..... | 342 feet. | 576 feet. | 403 feet. |
| (m) Capacity in gallons per minute..... | 750. | 1,500. | 1,300. |

TABLE XI.—*Report of operations of hydraulic graders for the calendar year ending Dec. 31, 1916—Continued.*

| 1. Name..... | No. 109. | No. 1011. | No. 1012. | No. 1013. |
|---|------------------------------------|---|---|--|
| MACHINERY—continued. | | | | |
| 19. Pump—Continued. | | | | |
| (a) Number of nozzles..... | 3 | | | 1 to 2. |
| (b) Size of hose nozzle..... | $\frac{3}{4}$ inch. | | | $1\frac{1}{4}$ to $1\frac{1}{2}$ inches. |
| 20. Condenser: | | | | |
| (a) Diameter and length..... | None. | $2\frac{1}{2}$ inches diameter, $7\frac{1}{2}$ feet long. | $2\frac{1}{2}$ inches diameter, $7\frac{1}{2}$ feet long. | 36 inches diameter, 30 feet long. |
| (b) Type..... | (c) Cooling surface..... | Alberger jet. | Alberger jet. | Wheeler (surface). |
| (c) Cooling surface..... | (d) Vacuum..... | 600 square feet. | 600 square feet. | 850. |
| (d) Vacuum..... | | 27 inches. | 27 inches. | 27 inches. |
| 21. Air pump: | | | | |
| (a) Make..... | None. | | | Wheeler. |
| (b) Size..... | | 12 inches diameter, 8-inch stroke. | 12 inches diameter, 8-inch stroke. | 12 inches diameter, 10-inch stroke. |
| (c) Strokes per minute..... | 20 to 30. | 20 to 30. | 20 to 30. | 20 to 30. |
| 22. Circulating pump: | | | | |
| (a) Make..... | None. | Alberger, connected to air pump. | Alberger, connected to air pump. | Wheeler. |
| (b) Size..... | | 12 inches diameter, 8-inch stroke. | 12 inches diameter, 8-inch stroke. | 12 inches diameter, 10-inch stroke. |
| (c) Revolutions per minute..... | 20 to 30. | 20 to 30. | 20 to 30. | 20 to 30. |
| 23. Feed pump: | | | | |
| (a) Make..... | Hooker. | Worthington duplex. | Worthington duplex. | Worthington duplex. |
| (b) Size..... | 5 by 3 by 8 inch stroke. | 8 inches diameter, 4-inch stroke. | 8 inches diameter, 4-inch stroke. | 6 inches diameter, 5 inches. |
| 24. Feed heater: | | | | |
| (a) Make..... | U. S. Engineer Depot. | Hot well with steam col. | Hot well with steam col. | None; hot well with steam col. |
| (b) Diameter and height..... | 18 inches by 6 feet length. | | | |
| (c) Heating surface..... | 214 square feet. | | | |
| (d) Temperature of feed water..... | 150° F. | 150 to 170° F. | 150 to 170° F. | 150 to 170° F. |
| (e) Temperature of supply..... | 30 to 70° F., according to season. | 50 to 80° F. | 50 to 80° F. | 50 to 80° F. |
| OPERATIONS. | | | | |
| 25. Total number of hours pumping..... | 294. | 1,431. | 959. | 1,322. |
| 26. Number of cubic yards graded per hour..... | 107. | 361. | 332. | 222. |
| 27. Number of cubic yards graded per day..... | 856. | 2,780. | 2,430. | 1,824. |
| 28. Total number of cubic yards graded during year..... | 31,446. | 517,080. | 367,431. | 294,443. |
| 29. Number of linear feet of bank grading done during year..... | 2,630. | 11,060. | 10,396. | 6,766. |
| COST OF WORK. | | | | |
| 30. Pay roll..... | \$2,109.08 | \$5,077.19 | \$4,261.83 | \$3,607.28 |
| 31. Substances..... | 473.00 | 1,766.00 | 1,054.84 | 1,364.00 |

[illegible]

TABLE XI.—*Report of operations of hydraulic graders for the calendar year ending Dec. 31, 1916—Continued.*

| 1. Name..... | No. 1089. | No. 1806. | No. 1491. | No. 8813. |
|--|--|--|--|---|
| 2. District..... | Mississippi River, first and second districts, Memphis, Tenn. | Mississippi River, first and second districts, Memphis, Tenn. | Mississippi River, first and second districts, Memphis, Tenn. | Mississippi River, first and second districts, Memphis, Tenn. |
| 3. Where built..... | Memphis, Tenn. | Memphis, Tenn. | Memphis, Tenn. | Memphis, Tenn. |
| 4. When built..... | 1911..... | 1914..... | 1915..... | 1923..... |
| 5. Builder..... | United States. | United States. | United States. | United States. |
| 6. Time to build..... | 10 months. | 18 months. | 12 months. | Unknown. |
| 7. Material of hull..... | Crescoted wood. | Steel. | Steel. | Wood and crescoted wood. |
| 8. Cost of hull..... | \$4,050. | \$8,900. | \$8,900. | Not known. |
| 9. Cost of machinery..... | \$11,890. | \$17,597. | \$14,773. | \$9,212.73. |
| 10. Total cost..... | \$15,900. | \$31,721.07. | \$30,893.43. | 120 feet. |
| 11. Length..... | 110 feet. | 120 feet 11 inches. | 120 feet 11 inches. | 25 feet. |
| 12. Beam..... | 30 feet. | 30 feet 2 inches. | 30 feet 2 inches. | 4 feet. |
| 13. Depth..... | 6 feet. | 7 feet. | 7 feet. | 1 foot 6 inches. |
| 14. Draft forward..... | 2 feet. | 2 feet 6 inches. | 2 feet 6 inches. | 1 foot 6 inches. |
| 15. Draft aft..... | 2 feet. | 2 feet 2 inches. | 2 feet 6 inches. | 1 foot 6 inches. |
| 16. Displacement..... | 180 long tons. | 192 long tons. | 196 long tons. | 124 long tons. |
| 17. Number of men in crew..... | 20..... | 20..... | 20..... | 4..... |
| 18. Ballers:
(a) Number and type..... | 3. Mississippi River type, return flue, each with two 14-inch flues. | 2. Internally fired, dry back, Scotch marine with Morrison flue. | 2. Internally fired, dry back, Scotch marine with 42-inch corrugated flue. | 2. Mississippi River type, return flue; 5 flues, 8 inches diameter. |
| (b) Diameter..... | 40 inches. | 48-inch flue. | 8 feet 1 inch. | 42 inches. |
| (c) Length..... | 26 feet. | 17 feet 4 inches. | 13 feet between heads. | 21 feet. |
| (d) Total heating surface..... | 1,148 square feet. | 2,500 square feet. | 2,592 square feet. | 826 square feet. |
| (e) Total grate surface..... | 65 square feet. | 56 square feet. | 56 square feet. | 45 square feet. |
| (f) Average pounds of coal burned per square foot of grate per hour..... | 180 pounds allowed. | 150 pounds. | 150 pounds. | 100 pounds allowed. |
| 19. Pump: | Steam turbine, direct connected. | Steam turbine, direct connected. | Turbine driven, direct connected. | Steam, rotative. |
| (a) How driven..... | 2-stage, 225 brake horsepower. | 2 stages, rated 165 brake horsepower. | No. 188 model, rated 165 brake horsepower. | 12 by 18 inches. |
| (b) Dimensions of cylinders or turbine..... | Terry Steam Turbine Co., Hartford, Conn. | Terry Steam Turbine Co., Hartford, Conn. | Kerr Turbine Co., Wellsville, N. Y. | Gordon Maxwell Co. |
| (c) Maker..... | 225 rated brake horsepower. | 165 rated brake horsepower. | 165 rated brake horsepower. | Not known. |
| (d) Indicated horsepower..... | 1,800. | 2,000. | 2,000 to 2,300. | 33. |
| (e) Revolutions per minute..... | Alberger Pump Co. | H. R. Worthington, Harrison, N. J. | Jeanesville Iron Works, Easton, Pa. | Gordon Maxwell Co. |
| (f) Make of pump..... | 8-inch, 4-stage. | 4-stage, 5-inch. | 5-inch, 4-stage, D. S. turbine pump. | 10 by 12 inches. |
| (g) Size..... | | | | |

| | | | |
|---|--|---|---|
| (b) Diameter of motion..... | 8 inches..... | 6 inches..... | 8 inches..... |
| (c) Diameter of discharge..... | do..... | 5 inches..... | 6 inches..... |
| (d) Number of stages..... | 4..... | 4..... | 1..... |
| (e) Revolutions per minute..... | 1,800..... | 2,000..... | 35..... |
| (f) Total head..... | 480 feet..... | 530 feet..... | 360 feet..... |
| (m) Capacity in gallons per minute..... | 1,300..... | 1,500 for 2 pumps..... | 280..... |
| (n) Number of nozzles..... | 1 to 2..... | 1 to 2..... | 1 to 2..... |
| (o) Size of hose nozzle..... | 1 to 1½ inches..... | 1 to 1½ inches..... | 1 to 1½ inches..... |
| 20. Condenser: | | | |
| (a) Diameter and length..... | 2 feet by 8 feet between heads..... | 36 inches by 7 feet 1 inch between heads..... | Inside 31½ inches by 9 feet long..... |
| (b) Type..... | Wheeler Condenser Co., water-works type..... | C. H. Wheeler, waterworks type, surface condenser..... | H. R. Worthington, waterworks, surface..... |
| (c) Cooling surface..... | 470 square feet, ½-inch tubes..... | 600 square feet..... | 610 square feet..... |
| (d) Vacuum..... | 26 inches..... | 26 inches..... | 28½ inches..... |
| 21. Air pump: | | | |
| (a) Make..... | Wheeler Condenser Co..... | C. H. Wheeler, Mullan horizontal rotative valveless pump..... | C. H. Wheeler, Mullan horizontal rotative valveless pump..... |
| (b) Size..... | 6 by 8 by 10 inches..... | 4 by 10 by 8 inches..... | 6 by 12 by 10 inches..... |
| (c) Strokes per minute..... | 60..... | 165..... | 72..... |
| 22. Circulating pump: | | | |
| (a) Make..... | None..... | None..... | None..... |
| (b) Size..... | None..... | None..... | None..... |
| (c) Revolutions per minute..... | None..... | None..... | None..... |
| 23. Feed pump: | | | |
| (a) Make..... | Cameron Steam Pump Co..... | 2, H. R. Worthington, outside center packed..... | 2, Platt Iron Works, outside end packed duplex..... |
| (b) Size..... | 8 by 3½ by 6 inches, single pump..... | 5½ by 3½ by 5 inches..... | 5½ by 3½ by 5 inches..... |
| (c) Make..... | Sims closed heater..... | Griscom Russell Co., Masillon, Ohio..... | Wainwright, Alberger Pump & Condenser Co..... |
| (d) Diameter and height..... | 18 inches, 48 inches between heads..... | 18 by 48 inches..... | 13½ inches by 5 feet between heads..... |
| (e) Heating surface..... | 65 square feet..... | Rated at 250 horsepower..... | Rated at 250 horsepower..... |
| (f) Temperature of feed water..... | 210° F..... | 140° to 190° F..... | 150° to 200° F..... |
| (g) Temperature of supply..... | 100° F..... | 100° F., hot well..... | 100° F., hot well..... |
| OPERATIONS. | | | |
| 25. Total number of hours pumping..... | 1,154..... | 510..... | 898..... |
| 26. Number of cubic yards graded per hour..... | 152.21..... | 246.5..... | 160.61..... |
| 27. Number of cubic yards graded per day..... | 1,261.78..... | 2,053..... | 1,378.24..... |
| 28. Total number of cubic yards graded during year..... | 176,650..... | 127,360..... | 140,581..... |
| 29. Number of linear feet of bank grading done during year..... | 6,040..... | 4,035..... | 4,395..... |
| | | | (9) |
| | | | United States, closed heater. |
| | | | 12 inches by 5 feet long. |
| | | | 160° F. |
| | | | 100° F., hot well. |

TABLE XI.—Report of operations of hydraulic graders for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name. | No. 1023. | No. 1936. | No. 1401. | No. 9813. |
|---|---|---|--|---|
| COST OF WORK. | | | | |
| 20. Pay roll..... | \$3,638.30 | \$1,712.30 | \$3,136.68 | |
| 31. Subsistence..... | 940.60 | 496.50 | 936.11 | |
| 32. Supplies: | | | | |
| (a) Machinery..... | 64.76 | 61.35 | 85.35 | |
| (b) Outfit..... | | 8.35 | | |
| 33. Coal..... | 1,490.85 | 662.50 | 1,344.66 | |
| 34. Miscellaneous..... | .90 | | 198.52 | |
| 35. Repairs: | | | | |
| (a) Hull..... | | 1,099.10 | 535.01 | |
| (b) Machinery..... | 468.16 | 1,100.26 | (9) | |
| 36. Office expenses..... | (1) | (1) | (9) | |
| 37. Surveys..... | (1) | (1) | (9) | |
| 38. Incidentals..... | | 293.14 | | |
| Grand total..... | \$6,594.57 | \$5,057.49 | \$6,235.33 | |
| 40. Total cost per cubic yard..... | \$0.03731 | \$0.0397 | \$0.0443 | |
| 41. Number of tons of coal used and cost per ton. | 895 tons, at \$2.50. | 265 tons, at \$2.50. | 540 tons, at \$2.50. | |
| | <p><i>Remarks.</i></p> <p>Electric light plant: Engine, American Blower Co., 6 by 6 inches, vertical; generator, Westinghouse, 15 k. w., 110 volts, 450 revolutions per minute; searchlight, Carlisle & Finch, 14-inch, 3,000 candlepower.</p> <p>Operated at Slough Landing Neck, Tenn., 1 month with revetment party; Gayoso Bend, Mo., 2 months with revetment party; Barfield, Ark., 1 month with revetment party; laid up at Delta, Miss.; laid up at Slough Landing Neck, 4 months.</p> <p>! Not kept separately.</p> | <p><i>Remarks.</i></p> <p>Electric light plant: Turbine, Terry Steam Turbine Co. type Z, 3,600 revolutions per minute; generator, Fort Wayne Electrical Co., 10 k. w., direct current, direct connected to turbine; searchlight, General Electric Co., 13-inch projector with diffusion lens.</p> <p>Operation at Bullertin Bar, 43 days, with revetment party; Barfield, Ark., 17 days with revetment party; laid up at Memphis, Tenn., 7 months.</p> <p>Delta, Miss., 3 months.</p> <p>! Addition to cabin.</p> <p>! Not kept separately.</p> | <p><i>Remarks.</i></p> <p>Electric light plant: Make, Terry Steam Turbine Co. for turbine, type Z; Fort Wayne generator, 10 k. w., 3,600 revolutions per minute; General Electric searchlight, 13 inches diameter with diffusion lens.</p> <p>Operated at Delta, Miss., 34 months with revetment party; Star Landing, Miss., 14 months with revetment party; laid up at Delta, Miss., 6 months; laid up at Memphis, Tenn., 1 month.</p> <p>! Built on steel material barge No. 1211.</p> <p>! Not kept separately.</p> | <p><i>Remarks.</i></p> <p>! Has not been used as a grader for several years.</p> <p>! Sand pump and screens added in 1914. Sand pump: Make, Morris Machine Works, Baldwinville, N. Y.; 1 1/2-inch horizontal manganese lined pump; capacity, 60 cubic yards per hour, 10 per cent solids; engines, 2 1/2 by 7 inch vertical, direct connected.</p> <p>Sunk Dec. 21, 1915. Grader abandoned Oct. 1916, after removing boilers and machinery.</p> |

TABLE XII.

DRILL BOATS.

4353

TABLE XII.—Report of operations of drill boats for the calendar year ending Dec. 31, 1916.

| 1. Name..... | Drill unit No. 1-B-1. | | | Drill unit No. 1-H-1. | | | Drill unit No. 1-T-1. | |
|---|----------------------------|------------------------------------|------------------------------------|----------------------------|--|----------------------------|---|--|
| | Derrick boat No. 6. | Drill boat No. 7. | Drill boat No. 8. | Pumpboat No. 1. | Raft No. 2. | Drill Tender No. 4. | Rafts Nos. 22, 23, 24. | |
| 2. District..... | Chattanooga, Tenn. | Chattanooga, Tenn. | Chattanooga, Tenn. | Chattanooga, Tenn. | Chattanooga, Tenn. | Chattanooga, Tenn. | Chattanooga, Tenn. | |
| 3. Where built..... | Knoxville, Tenn. | Williams Shoals. | Williams Shoals. | Muscle Shoals Canal. | Sheffield, Ala. | do. | Do. | |
| 4. When built..... | 1912. | 1916. | 1916. | 1910. | 1912. | Aug. 1, 1913. | Aug. 31, 1916. | |
| 5. Builder..... | U. S. Engineer Department. | U. S. Engineer Department. | U. S. Engineer Department. | U. S. Engineer Department. | U. S. Engineer Department. | U. S. Engineer Department. | U. S. Engineer Department. | |
| 6. Time to build..... | 58 days. | 15 days. | 15 days. | 3 months. | 30 days. | 3 months. | | |
| 7. Cost of hull..... | \$3,469.18. | \$594.64. | \$594.64. | \$6,439. | \$30. | \$3,630.59. | \$594.26. | |
| 8. Cost of machinery..... | \$3,110.1. | \$1,000. | \$1,000. | \$4,077.1. | \$2,940. | \$3,248.49. | \$1,775. | |
| 9. Total cost..... | \$6,579.53. | \$1,594.64. | \$1,594.64. | \$10,566. | \$3,760. | \$6,920.08. | \$2,272.26. | |
| 10. Present value..... | \$3,384.1. | \$1,095. | \$1,095. | \$3,461.1. | \$2,539. | \$4,852.2. | \$1,711. | |
| 11. Hull: | | | | | | | | |
| (a) Material..... | Wood. | Pine timbers. | Pine timbers. | Wood. | Wood. | Wood. | Wood. | |
| (b) Length..... | 80 feet. | 30 feet. | 30 feet. | 90 feet. | 30 feet. | 90 feet. | 30 feet. | |
| (c) Beam..... | 30 feet. | 16 feet. | 16 feet. | 24 feet. | 76 feet. | 30 feet. | 12 feet. | |
| (d) Depth..... | 4 feet. | 4 feet. | 4 feet. | 4 feet. | 18 inches. | 44 feet. | 10 inches. | |
| (e) Draft forward..... | 1 foot 6 inches. | 1 foot 6 inches. | 1 foot 6 inches. | 1 foot 10 inches. | 10 inches. | 1 foot 8 inches. | 1 foot 8 inches. | |
| (f) Draft aft..... | 1 foot. | 1 foot. | 1 foot. | 1 foot 10 inches. | 10 inches. | 1 foot 7 inches. | 1 foot 8 inches. | |
| (g) Displacement (long tons). | 76. | 113. | 113. | 113. | 40. | 117. | | |
| 12. Drills: | | | | | | | | |
| (a) Make..... | | Ingersoll-Sergeant. | Ingersoll-Sergeant. | | Ingersoll-Sergeant. | | Ingersoll-Rand & Chicago Pneumatic Tool Co. | |
| (b) Type (state manufacturer's number). | | E-24. | E-24. | | E-24. | | M-5 and 1087. | |
| (c) Number on boat..... | | 2 to each raft. | 2 to each raft. | | 12. | | 7. | |
| (d) Piston diameter..... | | 31 inches. | 31 inches. | | 31 inches. | | 31 inches. | |
| (e) Stroke..... | | 61 inches. | 61 inches. | | 61 inches. | | 61 inches. | |
| (f) Feed..... | | 2 feet. | 2 feet. | | Screw. | | 24 inches. | |
| (g) Chuck..... | | 42. | 42. | | 42. | | | |
| (h) Number of strokes per minute. | | 350. | 350. | | 180. | | 400. | |
| (i) Material of drill frame and how shifted along boat. | | Wooden tripod, shifted by derrick. | Wooden tripod, shifted by derrick. | | Wooden tripod, shifted by hand lavers. | | Wooden tripod, shifted by derrick. | |
| (j) Diameter of drill. | | 11 inches. | 11 inches. | | 11 by 11 inches. | | 3 inches. | |
| (k) Diameter of bit. | | 24 by 11 inches. | 24 by 11 inches. | | 2 to 31 inches. | | Cross. | |
| (l) Type of bit..... | | Cross. | Cross. | | Cross. | | | |
| (m) Size of jet pump..... | | None. | None. | | | | | |
| (n) Working pressure..... | | | | | | | | |
| (o) Number of jets..... | | | | | | | | |
| (p) Diameter of jets..... | | | | | | | | |
| 13. Number of repairs..... | 5. | 6 to each raft. | 6 to each raft. | 3. | 10. | 3. | a. | |

| 14. Size of spuds..... | 12 by 12 inches..... | 10 by 10 inches..... | 11 by 11 inches by 20 feet..... | 6 by 6 inches by 20 feet..... | 12 by 12 inches..... | 8 by 8 inches..... |
|--|---------------------------|---------------------------|---------------------------------|-------------------------------|-----------------------------|-----------------------------|
| 15. Size of spud engines..... | None..... | None..... | None..... | None..... | None..... | None..... |
| 16. Boiler: | | | | | | |
| (a) Type..... | Locomotive fire tube..... | Locomotive fire tube..... | Locomotive fire tube..... | Locomotive fire tube..... | Vertical tubular..... | Vertical tubular..... |
| (b) Diameter..... | 4 feet 1 inch..... | 4 feet 1 inch..... | 20 feet 6 inches..... | 20 feet 6 inches..... | 42 inches..... | 42 inches..... |
| (c) Length..... | 17 feet 4 inches..... | 17 feet 4 inches..... | 9 feet 11 inches..... | 9 feet 11 inches..... | 7.8 feet..... | 7.8 feet..... |
| (d) Height..... | 504 square feet..... | 504 square feet..... | 1,001 square feet..... | 1,001 square feet..... | 125 pounds..... | 125 pounds..... |
| (e) Heating surface..... | 18 square feet..... | 18 square feet..... | 25 square feet..... | 25 square feet..... | | |
| (f) Grate surface..... | 135 pounds..... | 135 pounds..... | 110 pounds..... | 110 pounds..... | | |
| (g) Working pressure..... | | | | | | |
| 17. Number of men in crew..... | 14 for each shift..... | 14 for each shift..... | 24..... | 24..... | 4..... | 4..... |
| 18. Number of barges..... | | | None..... | None..... | None..... | None..... |
| 19. Identifying numbers of barges..... | | | Lookout and King..... | Lookout and King..... | Hwassee..... | Hwassee..... |
| 20. Name of tug..... | Challivree..... | Challivree..... | Tennessee and Tusculumia..... | Tennessee and Tusculumia..... | Nolchucky and Kwandind..... | Nolchucky and Kwandind..... |
| 21. Name of dipper dredge to which drill boat is attached..... | Tellioo..... | Tellioo..... | | | | |
| OPERATION. | | | | | | |
| 22. Character of material..... | Rock..... | Rock..... | Rock..... | Rock..... | Limestone..... | Limestone..... |
| 23. Average depth of water..... | 2 feet..... | 2 feet..... | 5 feet..... | 5 feet..... | 4 feet..... | 4 feet..... |
| 24. Number of days worked..... | 123..... | 123..... | 115..... | 115..... | 33..... | 33..... |
| 25. Number of hours worked..... | 1,502..... | 1,502..... | 1,652..... | 1,652..... | 1,214..... | 1,214..... |
| 26. Number of hours delay..... | 602..... | 602..... | 573..... | 573..... | 101..... | 101..... |
| 27. Number of hours worked per day..... | 11..... | 11..... | 14..... | 14..... | 14..... | 14..... |
| 28. Number of holes..... | 5,474..... | 5,474..... | 2,307..... | 2,307..... | 3,414..... | 3,414..... |
| 29. Linear feet drilled (total)..... | 27,071..... | 27,071..... | 11,560..... | 11,560..... | 20,609.5..... | 20,609.5..... |
| 30. Linear feet drilled per hour with 1 drill..... | 18..... | 18..... | 7..... | 7..... | 17..... | 17..... |
| 31. Average depth of holes..... | 4.95 feet..... | 4.95 feet..... | 5 feet..... | 5 feet..... | 6.04 feet..... | 6.04 feet..... |
| 32. Distance between holes..... | 5 feet..... | 5 feet..... | 4 feet..... | 4 feet..... | 4 feet..... | 4 feet..... |
| 33. Distance between rows of holes..... | 6 feet..... | 6 feet..... | 64 feet..... | 64 feet..... | Do..... | Do..... |
| 34. Pounds of powder per hole..... | 2.44 pounds dynamite..... | 2.44 pounds dynamite..... | 3.7 pounds dynamite..... | 3.7 pounds dynamite..... | 4.15 pounds dynamite..... | 4.15 pounds dynamite..... |
| 35. Cubic yards of rock removed..... | 12,760 blasted..... | 12,760 blasted..... | 5,780 blasted..... | 5,780 blasted..... | 23,000 blasted..... | 23,000 blasted..... |
| COSTS. | | | | | | |
| 36. Pay roll..... | \$9,354.10..... | \$9,354.10..... | \$6,542.69..... | \$6,542.69..... | | \$6,698.69..... |
| 37. Subsistence..... | 2,912.75..... | 2,912.75..... | 2,017.65..... | 2,017.65..... | | 2,198.40..... |
| 38. Repairs..... | 292.41..... | 292.41..... | 377.60..... | 377.60..... | | 177.87..... |
| 39. Alterations and additions..... | | | | | | |
| 40. Fuel..... | 630.69..... | 630.69..... | 1,223.00..... | 1,223.00..... | | 630.16..... |
| 41. Dynamite..... | 3,849.73..... | 3,849.73..... | 2,290.37..... | 2,290.37..... | | 3,539.82..... |
| 42. Supplies..... | 605.18..... | 605.18..... | 713.85..... | 713.85..... | | 462.45..... |
| 43. Miscellaneous..... | 90..... | 90..... | | | | 103.26..... |
| 44. Office expenses..... | 2,094.08..... | 2,094.08..... | 1,353.50..... | 1,353.50..... | | 2,232.76..... |
| 45. Tug expenses..... | 70.06..... | 70.06..... | 1,854.63..... | 1,854.63..... | | 1,389.55..... |
| 46. Barge expenses..... | | | | | | |
| 47. Dredging rock (proportionate charge)..... | | | | | | |
| 48. Total..... | | \$19,809.90..... | | \$16,323.28..... | | \$17,422.96..... |

TABLE XII.—Report of operations of drill boats for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name. | Drill unit No. 1-B. ¹ | Drill unit No. 1-H. ¹ | Drill unit No. 1-T. ¹ |
|--|---|---|---|
| MISCELLANEOUS DATA. | | | |
| 49. Cost of coal per ton and number of tons purchased. | \$2.86; 220.53 tons used. | \$2.07 ¹ ; 589 tons used. | \$2.65; 237 tons used. |
| 50. Cost of dynamite per pound and number of pounds purchased. | \$25.77; 13,330 pounds used. | 21 ¹ cents; 10,640 pounds used. | 26 cents per pound; 14,160 pounds used. |
| 51. Cost per cubic yard of rock removed. | \$1.55. | \$2.82. | 75.7 cents. |
| 52. Distance rock was moved, in miles. | 46 blasted ² . | 25 blasted ² . | 139. ³ |
| 53. Cubic yards of rock removed per day. | 73 cents. | \$1.41. | 84.5 cents. |
| 54. Cost per foot of drilling rock. | 98 ¹ . | 50 ¹ . | 124. ³ |
| 55. Number of linear feet of rock drilled per day. | | | |
| 56. Cost of operating drill boat per working day. | \$71.77 ¹ . | \$70.97 ¹ . | \$104.98. ⁴ |
| | Remarks.
Lyons Shoals, Tennessee River.
¹ The outfit consists of 3 rafts for supporting the drills and a derrick boat, which is used for handling the drills and for supplying steam for operating them.
² Including drills.
³ To a depth of 1 foot below grade.
⁴ Includes dynamite and fuses.
⁵ Includes field, Nashville, and Cincinnati office expenses.
⁶ Includes towboats and launches.
⁷ Per aggregate 8-hour shift actually worked. | Remarks.
Kogers Island and Tusculum Barracks, Tennessee River.
¹ This outfit consists of raft for supporting drills and pump boat No. 1, which is used for handling the drills and for supplying steam for operating them.
² Including drills.
³ To a depth of 1 foot below grade.
⁴ Includes field and Nashville office expenses.
⁵ Includes towboats and launches.
⁶ Per aggregate 8-hour shift actually worked. | Remarks.
Sale Creek Shoals, Tennessee River.
¹ The outfit consists of rafts for supporting the drills and a tender, which is used for handling the drills and for supplying steam for operating them.
² Including drills.
³ To a depth of 1 foot below grade.
⁴ Includes field, Nashville, and Cincinnati office expenses.
⁵ Includes towboats and launches.
⁶ Per aggregate 8-hour shift actually worked. |

| 1. Name | No. 1. | No. 1 Columbia River. | Drill unit No. 2-H1 | | No. 2. |
|---|-----------------------|------------------------------------|----------------------------|--------------------------------------|-----------------------|
| | | | Drill Tender No. 2. | Raft No. 2. | |
| 2. District..... | First, Portland, Ore. | Seattle, Wash. | Chattanooga, Tenn. | Chattanooga, Tenn. | First, Portland, Ore. |
| 3. Where built..... | Riparia, Wash. | Wenatchee, Wash. | Sheffield, Ala. | Sheffield, Ala. | Riparia, Wash. |
| 4. When built..... | 1907 | 1911 | September, 1912 | 1913 | 1907 |
| 5. Builder..... | Joseph Supple. | U. S. Engineer Department. | U. S. Engineer Department. | U. S. Engineer Department. | Joseph Supple. |
| 6. Time to build..... | 4 months | 3 months | 40 days | 20 days | 4 months |
| 7. Cost of hull..... | \$3,275 | \$1,407 | \$3,164.02 | \$820 | \$3,275 |
| 8. Cost of machinery..... | \$4,682 | \$12,000, complete with equipment. | \$2,721.70 | \$2,940 | \$1,407 |
| 9. Total cost..... | | \$8,000 | \$5,885.72 | \$3,780 | \$4,682 |
| 10. Present value..... | | | \$3,585 | \$2,540 | \$1,500 |
| 11. Hull: | | | | | |
| (a) Material..... | Wood, Oregon fir. | Wood | Wood | Wood | Wood, Oregon fir. |
| (b) Length..... | 100 feet | 100 feet | 50 feet | 30 feet each boat. | 65 feet. |
| (c) Beam..... | 26 feet | 26 feet 6 inches | 30 feet | 76 feet 4 inches | 20 feet. |
| (d) Depth..... | 3 feet 8 inches | 4 feet | 4 feet | 1 foot 6 inches | 3 feet 8 inches. |
| (e) Draft forward..... | 1 foot 4 inches | 1 foot 6 inches | 1 foot 8 inches | 10 inches | 1 foot 4 inches. |
| (f) Draft aft..... | 1 foot 4 inches | 1 foot 6 inches | 1 foot 8 inches | 10 inches | 1 foot 4 inches. |
| (g) Displacement (long tons)..... | 50 | 100 | 150 | 40 | 50. |
| 12. Drills: | | | | | |
| (a) Make..... | Ingersoll-Rand | Ingersoll-Rand, Sargent | | Ingersoll-Sargent | Ingersoll-Rand. |
| (b) Type (state manufacturer's number)..... | D-24 | E-24 | | E-24 | D-24 |
| (c) Number on boat..... | 2 | 3 | | 12 | 2 |
| (d) Piston diameter..... | 3 inches. | 31 inches | | 31 inches | 3 inches. |
| (e) Stroke..... | 64 inches | 64 inches | | 6 inches | 64 inches. |
| (f) Feed..... | 24 inches | 24 inches | | Screw | 24 inches. |
| (g) Chuck..... | 14 inches | 14 by 6 inches | | 43 inches | 11 inches diameter. |
| (h) Number of strokes per minute..... | 400 | Use tripped | | 180-100 pounds steam | 400. |
| (i) Material of drill frame and how shifted along boat..... | Wood, bolted to scow | | | Wooden tripod shifted by hand levers | Wood, bolted to scow. |
| 13. Diameter of drill..... | 14 inches | 14 inches | | 14 to 14 inches | 14 inches |
| (a) Diameter of bit..... | 24 inches | 24 to 14 inches. | | 2 to 24 inches | 24 inches. |
| (b) Type of bit..... | Cross | Cross and + | | Cross | Cross. |
| (c) Size of jet pump..... | None | None | | None | None. |
| (d) Working pressure..... | do | do | | None | do |
| (e) Number of jets..... | do | do | | None | do |
| (f) Diameter of jets..... | 2 | 4 | | 10 | 2 |
| 14. Number of spuds..... | 2 | 11 by 11 inches by 30 feet. | | 6 by 6 inches by 20 feet. | 10 inches square. |
| 15. Size of spuds..... | 10 inches square. | 14 inches square | | None | None. |
| 16. Size of spud engines..... | None | None | | None | None. |

TABLE XII.—Report of operations of drill boats for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name..... | No. 1. | No. 1 Columbia River. | Drill unit No. 2-H.1 | | No. 2. |
|--|----------------------|-----------------------|------------------------------|-------------|----------------------|
| | | | Drill Tender No. 2. | Raft No. 3. | |
| 16. Boiler: | | | | | |
| (a) Type..... | Upright..... | Locomotive..... | Locomotive fire tube..... | | Upright..... |
| (b) Diameter..... | 42 inches..... | 40 inches..... | 60 inches..... | | 28 inches..... |
| (c) Length..... | 34 inches..... | 15 feet..... | 20 feet..... | | 82 inches..... |
| (d) Height..... | 200 square feet..... | 255 square feet..... | 9 feet 8 inches..... | | 200 square feet..... |
| (e) Heating surface..... | 8 square feet..... | 15 square feet..... | 25 square feet..... | | 8 square feet..... |
| (f) Grate surface..... | 110 pounds..... | 100 pounds..... | 120 pounds..... | | 110 pounds..... |
| (g) Working pressure..... | | | | | |
| 17. Number of men in crew..... | 9..... | Average, 11..... | 34..... | | 9..... |
| 18. Number of barges..... | | None..... | None..... | | None..... |
| 19. Identifying numbers of barges..... | | | | | |
| 20. Name of tug..... | Launch Ocla..... | Kettle Falls..... | Lookout and King..... | | Launch Coyote..... |
| 21. Name of dipper dredge to which drill boat is attached..... | | | Tennessee and Tuscumbia..... | | |
| OPERATION. | | | | | |
| 22. Character of material..... | Basaltic rock..... | | Rock..... | | Basaltic rock..... |
| 23. Average depth of water..... | 2 feet..... | | 5 feet..... | | 2 feet..... |
| 24. Number of days worked..... | 97..... | | 118..... | | 138..... |
| 25. Number of hours worked..... | 520..... | | 1,710..... | | 970..... |
| 26. Number of hours delay..... | 216..... | | 578..... | | 134..... |
| 27. Number of hours worked per day..... | 8..... | | 144..... | | 8..... |
| 28. Number of holes..... | 259..... | | 2,735..... | | 477..... |
| 29. Linear feet drilled (total)..... | 1,944..... | | 13,113..... | | 2,457..... |
| 30. Linear feet drilled per hour with one drill..... | 2.4..... | | 7.67..... | | 2.2..... |
| 31. Average depth of holes..... | 7.5 feet..... | | 4.5 feet..... | | 5.1 feet..... |
| 32. Distance between rows..... | 2.5 feet..... | | 4 feet..... | | 2.5 feet..... |
| 33. Distance between rows of holes..... | 4 feet..... | | 61 feet..... | | 4 feet..... |
| 34. Pounds of powder per hole..... | 8.5..... | | 3.6 pounds dynamite..... | | 6.3..... |
| 35. Cubic yards of rock removed..... | 744..... | | 6,560 blasted..... | | 1,870..... |

| costs. | | | |
|--|--|---|--|
| 36. Pay roll..... | \$3,619.49 | | \$4,022.07 |
| 37. Subistence..... | 582.43 | | 541.72 |
| 38. Repairs..... | | | 11.40 |
| 39. Alterations and additions..... | | | |
| 40. Fuel..... | 238.11 | | 217.50 |
| 41. Dynamite..... | 388.06 | | 771.77 |
| 42. Supplies..... | 383.23 | | 641.19 |
| 43. Miscellaneous..... | 314.93 | | 139.22 |
| 44. Office expenses..... | 112.00 | | 112.00 |
| 45. Tug expenses..... | 646.30 | | 669.79 |
| 46. Barge expenses..... | | | |
| 47. Dredging rock (proportionate charge) | | | |
| 48. Total..... | \$6,314.59 | \$18,061.79 | \$7,457.26 |
| MISCELLANEOUS DATA. | | | |
| 49. Cost of coal per ton and number of tons purchased..... | 50 tons, at \$6.40 per ton..... | | 50 tons, at \$4.50 per ton. |
| 50. Cost of dynamite per pound and number of pounds purchased..... | 2,200 pounds, at 18 cents and 244 cents. | | 3,200 pounds, at 244 cents. |
| 51. Cost per cubic yard of rock removed..... | \$8.48 | | \$4.75. |
| 52. Distance rock was moved, in miles..... | 10..... | | Blasted into deep water. |
| 53. Cubic yards of rock removed per day..... | \$2.25..... | | 11..... |
| 54. Cost per foot of drilling rock..... | 38.1..... | | \$1.75. |
| 55. Number of linear feet of rock drilled per day..... | \$51..... | | 18..... |
| 56. Cost of operating drill boat per working day..... | | | \$46.30. |
| | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> |
| | In swift water of Umatilla Rapids, Upper Columbia River. | Kogers Island and Tuscumbia Bar, Tennessee River.
1 This outfit consists of raft for supporting drills and tender for supplying steam for operating drills and handling them.
2 Including drills.
3 To a depth of one foot below grade.
4 Includes field and Nashville office charges.
5 Includes tow boats and launches.
6 Per aggregate 8-hour shift actually worked. | Employed on upper Columbia and Snake Rivers in swift waters. |

TABLE XII.—*Report of operations of drill boats for the calendar year ending Dec. 31, 1916—Continued.*

| 1. Name..... | No. 2, Columbia River. | Drill Unit No. 2-3. | | No. 3. | No. 3, Columbia River. |
|---|----------------------------|---|---------------------------------------|-----------------------|-----------------------------------|
| | | Drill Tender No. 3. | Boat No. 3. | | |
| 2. District..... | Seattle, Wash. | Chattanooga, Tenn. | Chattanooga, Tenn. | First, Portland, Ore. | Seattle, Wash. |
| 3. Where built..... | Wenatchee, Wash. | Muscle Shoals, Ala. | Shofield, Ala. | Riparia, Wash. | Wenatchee, Wash. |
| 4. When built..... | 1911. | 1913. | 1913. | 1907. | 1911. |
| 5. Builder..... | U. S. Engineer Department. | U. S. Engineer Department. | U. S. Engineer Department. | Joseph Supply. | U. S. Engineer Department. |
| 6. Time to build..... | 3 months. | 5 months. | 1 month. | 4 months. | 3 months. |
| 7. Cost of hull..... | | \$4,719.83. | \$3,656.26. | \$1,407. | \$12,000 complete with equipment. |
| 8. Cost of machinery..... | | \$2,213.96. | \$3,656.36. | \$1,407. | \$3,000. |
| 9. Total cost..... | | \$6,933.79. | \$7,312.62. | \$2,814. | |
| 10. Present value..... | | \$4,200. | \$2,600. | \$1,500. | |
| 11. Hull: | | | | | |
| (a) Material..... | Wood. | Wood. | Wood. | Wood, Oregon fir. | Wood. |
| (b) Length..... | 100 feet. | 80 feet. | 70 feet. | 65 feet. | 100 feet. |
| (c) Beam..... | 26 feet 6 inches. | 30 feet. | 20 feet. | 20 feet. | 26 feet 6 inches. |
| (d) Depth..... | 4 feet 6 inches. | 4 feet 6 inches forward; 4 feet 9 inches aft. | 1 foot 8 inches. | 3 feet 8 inches. | 4 feet 6 inches. |
| (e) Draft forward..... | 1 foot 6 inches. | 1 foot 6 inches. | 10 inches. | 1 foot 4 inches. | 1 foot 6 inches. |
| (f) Draft aft..... | 1 foot 6 inches. | 1 foot 6 inches. | 10 inches. | 1 foot 4 inches. | 1 foot 6 inches. |
| (g) Displacement (long tons)..... | 100. | 131. | 46 with drills. | 50. | 100. |
| 12. Drills: | | | | | |
| (a) Make..... | Ingersoll-Rand, Sergeant. | | Ingersoll-Sergeant. | Ingersoll-Rand. | Ingersoll-Rand, Sergeant. |
| (b) Type (state manufacturer's number)..... | E-24. | | E-24. | D-24. | E-24. |
| (c) Number on boat..... | 3. | 11. | 11. | 2. | 3. |
| (d) Piston diameter..... | 34 inches. | 34 inches. | 34 inches. | 34 inches. | 34 inches. |
| (e) Stroke..... | 64 inches. | 64 inches. | 64 inches. | 64 inches. | 64 inches. |
| (f) Feed..... | 24 inches. | 24 inches. | 24 inches. | 24 inches. | 24 inches. |
| (g) Volute..... | 14 by 6 inches. | 42 inches. | 42 inches. | 14 inches diameter. | 14 by 6 inches. |
| (h) Number of strokes per minute..... | Use tripod. | 60. | 60. | 40. | Use tripod. |
| (i) Material of drill frame and how shifted along boat..... | | Wooden tripod, shifted by punch bars. | Wooden tripod, shifted by punch bars. | Wood, bolted to scow. | |
| (j) Diameter of drill..... | 14 inches. | 11 inches. | 11 inches. | 11 inches. | 11 inches. |
| (k) Type of bit..... | 34 to 14 inches. | 21 inches and 11 inches. | 21 inches and 11 inches. | 21 inches. | 34 to 14 inches. |
| (l) Type of bit..... | None. | 21, 24, 31, and 3 inches. | 21, 24, 31, and 3 inches. | 21 inches. | 34 to 14 inches. |
| (m) Size of jet pump..... | None. | None. | None. | None. | None. |
| (n) Working pressure..... | None. | None. | None. | None. | None. |
| (o) Number of jets..... | None. | None. | None. | None. | None. |
| (p) Diameter of jets..... | None. | None. | None. | None. | None. |
| 13. Number of spuds..... | 4. | 3. | 3. | 3. | 4. |

| 14. Size of spuds..... | 14 inches square..... | 10 by 10 inches by 15 feet..... | 6 by 6 inches by 15 feet..... | 10 inches square..... | 14 inches square..... |
|--|--------------------------|---------------------------------|-------------------------------|-----------------------|-----------------------|
| 15. Size of spud engines..... | None..... | None..... | None..... | None..... | None..... |
| 16. Baler..... | Locomotive..... | Locomotive fire tube..... | Locomotive fire tube..... | Upright..... | Locomotive..... |
| (a) Type..... | 40 inches..... | 20 feet..... | 20 feet..... | 42 inches..... | 40 inches..... |
| (b) Diameter..... | 15 feet..... | 6 feet..... | 6 feet..... | 34 inches..... | 15 feet..... |
| (c) Length..... | 255 square feet..... | 985 square feet..... | 985 square feet..... | 225 square feet..... | 255 square feet..... |
| (d) Hoisting surface..... | 15 square feet..... | 22 square feet..... | 22 square feet..... | 10 square feet..... | 15 square feet..... |
| (e) Grate surface..... | 100 pounds..... | 125 pounds..... | 125 pounds..... | 110 pounds..... | 100 pounds..... |
| (f) Working pressure..... | 10..... | 34..... | 34..... | 9..... | Average, 11..... |
| 17. Number of men in crew..... | None..... | None..... | None..... | None..... | None..... |
| 18. Number of barges..... | Kettle Falls..... | McPherson and Colbert..... | McPherson and Colbert..... | Launch Palouse..... | Kettle Falls..... |
| 19. Identifying numbers of barges..... | | Kentucky and Watauga..... | Kentucky and Watauga..... | | |
| 20. Name of tug..... | | | | | |
| 21. Name of dipper dredge to which drill boat is attached..... | | | | | |
| OPERATION. | | | | | |
| 22. Character of material..... | Granite..... | Rock..... | Rock..... | Basaltic rock..... | |
| 23. Average depth of water..... | Worked on shore..... | 34 feet..... | 34 feet..... | 5 feet..... | |
| 24. Number of days worked..... | 213..... | 78..... | 78..... | 86..... | |
| 25. Number of hours worked..... | 1,704..... | 1,184..... | 1,184..... | 528..... | |
| 26. Number of hours delay..... | None..... | 16..... | 16..... | 176..... | |
| 27. Number of hours worked per day..... | 8..... | 154..... | 154..... | 8..... | |
| 28. Number of holes..... | No record..... | 7,715..... | 7,715..... | 260..... | |
| 29. Linear feet drilled (total)..... | 3,371..... | 35,322..... | 35,322..... | 1,578..... | |
| 30. Linear feet drilled per hour with one drill..... | No record..... | 30..... | 30..... | 2.3..... | |
| 31. Average depth of holes..... | (1)..... | 4.6 feet..... | 4.6 feet..... | 6.1 feet..... | |
| 32. Distance between holes..... | (1)..... | 6 feet..... | 6 feet..... | 3.5 feet..... | |
| 33. Distance between rows of holes..... | (1)..... | 6 feet..... | 6 feet..... | 5 feet..... | |
| 34. Pounds of powder per hole..... | (1)..... | 3.56 pounds dynamite..... | 3.56 pounds dynamite..... | 5.1 pounds..... | |
| 35. Cubic yards of rock removed..... | At Hell Gate, 2,651..... | 30,418 blasted..... | 30,418 blasted..... | 1,492..... | |
| COSTS. | | | | | |
| 36. Pay roll..... | \$5,582.61..... | \$9,414.27..... | \$9,414.27..... | \$3,301.73..... | |
| 37. Subsistence..... | 1,585.16..... | 1,667.84..... | 1,667.84..... | 478.92..... | |
| 38. Repairs..... | 1,183.53..... | 1,247.30..... | 1,247.30..... | 233.57..... | |
| 39. Alterations and additions..... | | | | 312.27..... | |
| 40. Fuel..... | 611.57..... | 1,100.50..... | 1,100.50..... | 336.32..... | |
| 41. Dynamite..... | *1,016.49..... | 6,867.90..... | 6,867.90..... | 333.46..... | |
| 42. Supplies..... | 255.53..... | 411.10..... | 411.10..... | 203.77..... | |
| 43. Miscellaneous..... | 409.14..... | 512.20..... | 512.20..... | 324.12..... | |
| 44. Office expenses..... | 229.97..... | *1,390.15..... | *1,390.15..... | 112.12..... | |
| 45. Tug expenses..... | | *3,445.05..... | *3,445.05..... | 416.21..... | |
| 46. Barge expenses..... | | | | | |
| 47. Dredging rock (proportionate charge)..... | | | | | |
| 48. Total..... | \$9,874.30..... | \$25,166.31..... | \$25,166.31..... | | \$,964.42..... |

TABLE XII.—*Report of operations of drill boats for the calendar year ending Dec. 31, 1916—Continued.*

| 1. Name..... | No. 2, Columbia River. | Drill Unit No. 2-3-1 | No. 3. | No. 5, Columbia River. |
|--|--|--|--|--|
| MISCELLANEOUS DATA. | | | | |
| 49. Cost of coal per ton and number of tons purchased..... | 11½ cords wood, at \$5.50..... | \$3.50; 300 tons used..... | | |
| 50. Cost of dynamite per pound and number of pounds purchased..... | 2,000 pounds, at \$0.2435, and 1,500 pounds, at \$0.3136. (1)..... | 25 cents per pound; 27,475 pounds used..... | 60 tons, at \$6.25 and \$6.15 per ton.
2,000 pounds, at 24½ cents..... | |
| 51. Cost per cubic yard of rock removed..... | None..... | 82.7 cents..... | \$4..... | |
| 52. Distance rock was moved, in miles..... | (1)..... | 190 blasted *..... | Blasted into deep water..... | |
| 53. Cubic yards of rock removed per day..... | (1)..... | 73.6 cents..... | 17..... | |
| 54. Cost per foot of drilling rock..... | (1)..... | 277 *..... | \$2.30..... | |
| 55. Number of linear feet of rock drilled per day..... | Average, 16..... | | 18..... | |
| 56. Cost of operating drill boat per working day..... | \$46.35..... | \$167.73 *..... | \$50.40..... | |
| | Remarks.
Operated at Hell Gate on Columbia River, Jan. 1 to Mar. 31, 1916.
Operated at Box Canyon on Columbia River, Oct. 1, to Dec. 31, 1916.
* Work was all on bowlders on beach, and from its nature no record could be made of these items.
* Rock removed at Box Canyon this fall has not been measured to date, but will be obtained in the spring at end of work.
* Includes 900 cays, at 7.45, 6.23, 6.35, and 6.61 per 100. | Remarks.
Big Bend Shoals and Riverton Lock approach, Tennessee River.
* The outfit consists of a raft for supporting the drills, and a tender, which is used for handling the drills and for supplying steam for operating them.
* Including drills.
* To a depth of 1 foot below grade.
* Includes field, Nashville, and Cincinnati office expenses.
* Includes towboat and launches.
* Per aggregate 8-hour shift actually worked. | Remarks.
Working on Upper Columbia River at John Day Rapids, in deep, swift water. | Remarks.
This boat was out of commission during entire period. |

| 1. Name..... | Drill and No. 4-S. | | No. 9. | No. 10. | No. 11. |
|--|---|--------------------------------------|----------------------------------|----------------------------------|-----------------------------|
| | Berge No. 38. | Eaft No. 4. | | | |
| 2. District..... | Chattanooga, Tenn. | Chattanooga, Tenn. | Louisville, Ky. | Louisville, Ky. | Louisville, Ky. |
| 3. Where built..... | Muscul Shoals Canal, Ala. | Sheffield, Ala. | Clarington, Ohio. | Clarington, Ohio. | Do. |
| 4. When built..... | 1912. | 1913. | 1910. | 1910. | 1910. |
| 5. Builder..... | U. S. Engineer Department. | U. S. Engineer Department. | Mozena Bros. | Mozena Bros. | United States. |
| 6. Time to build..... | 1 month. | 1 month. | 10 days. | 10 days. | 10 days. |
| 7. Cost of hull..... | \$2,000.11 | \$2,000.11 | \$450. | \$450. | \$271.37 |
| 8. Cost of machinery..... | \$2,654.25 | \$2,654.25 | \$1,470. | \$1,470. | \$271.37 |
| 9. Total cost..... | \$4,654.36 | \$4,654.36 | \$1,920. | \$1,920. | \$1,455.37 |
| 10. Present value..... | \$3,121. | \$2,560. | \$100 (hull). | \$100 (hull). | \$100 (hull). |
| 11. Hull: | | | | | |
| (a) Material..... | Wood. | Wood. | Wood. | Wood. | Wood. |
| (b) Length..... | 30 feet. | 30 feet. | 40 feet. | 40 feet. | 40 feet. |
| (c) Beam..... | 24 feet. | 24 feet. | 14 feet. | 14 feet. | 14 feet. |
| (d) Depth..... | 5 feet 3 inches. | 1 foot 8 inches. | 2 feet 8 inches. | 2 feet 8 inches. | 2 feet 8 inches. |
| (e) Draft forward..... | 1 foot 4 inches. | 10 inches. | 1 foot 3 inches. | 1 foot 3 inches. | 1 foot 3 inches. |
| (f) Draft aft..... | 1 foot 4 inches. | 10 inches. | 1 foot 2 inches. | 1 foot 2 inches. | 1 foot 2 inches. |
| (g) Displacement (long tons)..... | 45 | 46 with drills. | 10. | 10. | 10. |
| 12. Drills: | | | | | |
| (a) Make..... | | Ingersoll-Sergeant. | Ingersoll-Rand | Ingersoll-Rand | Cyclone. |
| (b) Type (state manufacturer's number)..... | | E-28. | F-1, Davis-Calyx. | F-1, Davis-Calyx. | No. 4, Hollow rod. |
| (c) Number on boat..... | 11 | 11 | 1 | 1 | 1 |
| (d) Piston diameter..... | 21 inches. | 21 inches. | 5 inches. | 5 inches. | 5 inches. |
| (e) Stroke..... | 24 inches. | 24 inches. | 7 inches. | 7 inches. | 7 inches. |
| (f) Feed..... | 1/2". | 1/2". | Hand, 4-foot. | Hand, 4-foot. | Screw V threads. |
| (g) Chuck..... | 350. | 350. | Screw, square thread. | Screw, square thread. | 40 (ordinary lead). |
| (h) Number of strokes per minute..... | | | Wood, stationary. | Wood, stationary. | Wood, stationary. |
| (i) Material of drill frame and how suited along boat..... | Wooden tripod, suited by pinch bars. | Wooden tripod, suited by pinch bars. | | | |
| (j) Diameter of drill..... | 11 and 11 inches. | 11 and 11 inches. | 3 1/4 inches; shot. | 3 1/4 inches; shot. | 3 1/4 inches. |
| (k) Diameter of bit..... | 2 1/2, 2 1/2, and 3 inches. | 2 1/2, 2 1/2, and 3 inches. | 3 1/4 inches; chopping. | 3 1/4 inches; chopping. | 3 1/4 inches. |
| (l) Type of bit..... | Cross. | Cross. | Shot, chopping, and Davis-Calyx. | Shot, chopping, and Davis-Calyx. | Chopping. |
| (m) Size of jet pump..... | None. | None. | 4 1/2 by 2 1/2 by 4 inches. | 4 1/2 by 2 1/2 by 4 inches. | 5 1/2 by 3 1/2 by 5 inches. |
| (n) Working pressure..... | | | 30 pounds. | 30 pounds. | 40 to 50 pounds. |
| (o) Number of jets..... | | | 1 and 1 inch. | 1 and 1 inch. | 1 inch. |
| (p) Diameter of jets..... | | | 6 by 6 inches by 24 feet. | 6 by 6 inches by 24 feet. | 6 by 6 inches by 24 feet. |
| 13. Number of spuds..... | 3. | 8. | | | |
| 14. Size of spuds..... | Two 12 1/2 by 12 1/2 inches by 25 feet; one 11 by 11 inches by 25 feet. | 6 by 6 inches by 18 feet. | | | |

TABLE XII.—Report of operations of drill boats for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name. | Drill unit No. 4-S. | | No. 9. | No. 10. | No. 11. |
|--|------------------------|-------------|------------------------|---------------------------------------|---|
| | Barge No. 39. | Raft No. 4. | | | |
| 15. Size of spud engines. | None. | None. | None. | None. | None. |
| 16. Boiler: | | | | | |
| (a) Type. | Locomotive fire tube. | | Vertical, tubular. | Vertical, tubular. | Vertical, tubular. |
| (b) Diameter. | 60 inches. | | 30 inches. | 30 inches. | 30 inches. |
| (c) Length. | 20 feet. | | 7 feet 1 inch. | 7 feet 1 inch. | 7 feet. |
| (d) Height. | 6 feet. | | 138 square feet. | 138 square feet. | 135 square feet. |
| (e) Heating surface. | 965 square feet. | | 314 square feet. | 314 square feet. | 34 square feet. |
| (f) Grate surface. | 22 square feet. | | 80 pounds. | 80 pounds. | 80 pounds. |
| (g) Working pressure. | 125 pounds. | | | | |
| 17. Number of men in crew. | 32. | | 2. | 3. | 3. |
| 18. Number of barges. | None. | | None. | None. | |
| 19. Identifying numbers of barges. | | | | | |
| 20. Name of rig. | McPherson and Colbert. | | Comet No. 2. | Eddie T. | Eddie T. |
| 21. Name of derrick derrick to which drill boat is attached. | Kentucky and Watauga. | | None. | | |
| OPERATION. | | | | | |
| 22. Character of material. | Rock. | | Shale, rock, and clay. | Sandstone, shale, and indurated clay. | Sand and gravel, sandstone shale, and indurated clay. |
| 23. Average depth of water. | 31 feet. | | 5 feet. | 9 feet. | 9 feet. |
| 24. Number of days worked. | 74. | | 50. | 47. | 47. |
| 25. Number of hours worked. | 1,128. | | 329. | 329. | 329. |
| 26. Number of hours delay. | 28. | | 240. | 471. | 471. |
| 27. Number of hours worked per day. | 144. | | 8. | 8. | 8. |
| 28. Number of holes. | 4,461. | | 20. | 41. | 88. |
| 29. Linear feet drilled (total). | 20,463. | | 180. | 331.8. | 1,183.4. |
| 30. Linear feet drilled per hour with one drill. | 19. | | 1. | 1. | 8.5. |
| 31. Average depth of holes. | 4.6 feet. | | 8 feet. | 8.9 feet. | 13.1 feet. |
| 32. Distance between holes. | 6 feet. | | 160 feet. | 200 feet. | 200 feet. |
| 33. Distance between rows of holes. | 40 feet. | | | Scattered drilling. | Scattered drilling. |
| 34. Pounds of powder per hole. | 3.57 pounds dynamite. | | | | |
| 35. Cubic yards of rock removed. | 80,418 blasted. | | | | |

cents.

| | | | | |
|--|-------------------------------------|---|----------------------|---|
| 36. Pay roll..... | \$3,451.91 | \$358.50 | \$1,097.94 | \$1,097.93 |
| 37. Subsistence..... | 1,492.37 | 104.18 | 254.03 | 254.04 |
| 38. Repairs..... | 1,144.15 | 173.75 | 299.23 | 299.23 |
| 39. Alterations and additions..... | | 21.14 | | |
| 40. Fuel..... | | 18.00 | 214.00 | 214.00 |
| 41. Dynamite..... | 947.10 | | | |
| 42. Supplies..... | 4,895.08 | | | |
| 43. Miscellaneous..... | 429.00 | | | |
| 44. Office expenses..... | 415.54 | | | |
| 45. Tug expenses..... | 1,203.38 | | | |
| 46. Barge expenses..... | \$3,448.08 | | | |
| 47. Dredging rock (proportionate charge). | | 244.62 | 330.00 | 330.00 |
| 48. Total..... | \$21,367.54 | \$1,188.96 | \$2,322.61 | \$2,302.45 |
| MISCELLANEOUS DATA. | | | | |
| 49. Cost of coal per ton and number of tons purchased..... | \$3.40; 290 tons used..... | \$1.50; 12 tons..... | \$2.50; 25 tons..... | \$2.50; 25 tons..... |
| 50. Cost of dynamite per pound and number of pounds purchased..... | 28.8 cents; 16,665 pounds used..... | | | |
| 51. Cost per cubic yard of rock removed..... | 70.2 cents..... | | | |
| 52. Distance rock was moved, in miles..... | 190 yards blasted *..... | | | |
| 53. Cubic yards of rock removed per day..... | 90.7 yards..... | \$11.22 | | |
| 54. Cost per foot of drilling rock..... | 137 *..... | 3 feet..... | | |
| 55. Number of linear feet of rock drilled per day..... | | | | |
| 56. Cost of operating drill boat per working day..... | \$138.97 *..... | \$35.92 | \$13.50 * | \$13.50 * |
| | Remarks. | Machinery installed on fuel flat in Louisville district. Loaned to first Cincinnati district and operated as a drill boat in that district since Sept. 23, 1916.
* Formerly No. 9, 20-ton fuel flat. | Remarks. | Not operated in Louisville district during year. Employed in Wheeling, W. Va., district since Mar. 29, 1916, in exploratory drilling for lock foundations.
* Not including delay due to moving and high water.
* Not including towing and overhead charges. |

TABLE XII.—Report of operations of drill boats for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name..... | No. 16. | No. 25, Hudson River. | No. 30, Hudson River. |
|---|---|-----------------------------|----------------------------------|
| 2. District..... | Montgomery, Ala. | First New York. | First, New York. |
| 3. Where built..... | Bainbridge, Ga. | Albany, N. Y. | Albany, N. Y. |
| 4. When built..... | 1903 (rebuilt 1910, Columbus, Ga.) | 1916. | 1915. |
| 5. Builder..... | U. S. Engineer Department. | U. S. Engineer Department. | U. S. Engineer Department. |
| 6. Time to build..... | 4 months. | About 1 month. | 2 months. |
| 7. Cost of hull..... | \$2,960. | \$412.50. | \$2,597.50. |
| 8. Cost of machinery..... | \$87. | \$351. | \$9,402.50. |
| 9. Total cost..... | \$5,220 as rebuilt with cabin, 68 feet. | \$983.50. | \$12,000. |
| 10. Present value..... | \$3,750. | \$580. | \$8,138. |
| 11. Hull: | Wood. | Wood. | Wood. |
| (a) Material..... | 68 feet. | 34 feet 4 inches. | 80 feet. |
| (b) Length..... | 26 feet. | 15 feet 6 inches. | 26 feet. |
| (c) Beam..... | 5 feet. | 4 feet. | 3 feet 8 inches. |
| (d) Depth..... | 1 foot 6 inches. | 2 feet 6 inches. | 2 feet 2 inches. |
| (e) Draft forward..... | 1 foot 6 inches. | 2 feet 6 inches. | 2 feet 2 inches. |
| (f) Draft aft..... | 1 foot 6 inches. | 37. | 130. |
| (g) Displacement (long tons)..... | 60. | 37. | 130. |
| 12. Drills: | None. | Sullivan Machinery Co. | Ingersoll-Rand. |
| (a) Make..... | None. | U. F. 11. | H. 9. |
| (b) Type (state manufacturer's number)..... | None. | 2. | 2. |
| (c) Number on boat..... | None. | 31 inches. | 51 inches. |
| (d) Piston diameter..... | None. | 31 inches. | 8 inches. |
| (e) Stroke..... | None. | Screw. | 10 feet. |
| (f) Feed..... | None. | "U" bolt. | "U" bolt type. |
| (g) Chuck..... | None. | 109. | 50. |
| (h) Number of strokes per minute..... | None. | Wood. | Wood; stationary. |
| (i) Material of drill frame and how shifted along boat..... | None. | 11 inches. | 31 inches. |
| (j) Diameter of drill..... | None. | 31 inches. | Do. |
| (k) Type of bit..... | None. | Cross (+). | 5-pointed star. |
| (l) Size of jet pump..... | None. | 6 by 4 by 6 inches. | 6 by 4 by 6 inches. |
| (m) Working pressure..... | None. | 70. | 100 pounds. |
| (n) Number of jets..... | None. | 2. | 2. |
| (o) Diameter of jets..... | None. | 1 to 1 inch. | 1 inch. |
| (p) Number of spuds..... | None. | 6 by 12 inches. | 15 by 15 inches by 32 feet long. |
| 13. Size of spuds..... | None. | One 2-drum (6 by 8 inches). | One 2-drum (7 by 10 inches). |
| 14. Size of spud engines..... | None. | One 2-drum (6 by 8 inches). | One 2-drum (7 by 10 inches). |

| | | | |
|--|--|---|---|
| 16. Boller. | None. | Vertical, water tube.
4 feet 6 inches. | Leg.
6 feet 6 inches.
14 feet 6 inches.
10 feet.
1,240 square feet.
25 square feet.
100 pounds.
11.
1.
No. 7 Hudson River.
None.
Do. |
| (a) Type. | | 9 feet. | |
| (b) Diameter. | | 12.56 square feet. | |
| (c) Length. | | 110 pounds. | |
| (d) Height. | | 5. | |
| (e) Heating surface. | | J. C. Reichert and Gen. Totten. | |
| (f) Heating surface. | | Julia Auten. | |
| (g) Grate surface. | | | |
| (h) Working pressure. | | | |
| 17. Number of barges. | | | |
| 18. Number of men in crew. | | | |
| 19. Identifying numbers of barges. | | | |
| 20. Name of tug. | | | |
| 21. Name of dipper dredge to which drill boat is attached. | | | |
| OPERATION. | | | |
| 22. Character of material. | None; used as quarter boat during the entire year. | Gray and bastard granite. | Shale, gray and bastard granite. |
| 23. Average depth of water. | | 12 feet, Harlem; 5 feet, Mamaroneck. | Hudson River, 10 feet; Harlem River, 12 feet. |
| 24. Number of days worked. | | 60. | 254. |
| 25. Number of hours worked. | | 156.25. | 1,763 hours 55 minutes. |
| 26. Number of hours delay. | | 323.35. | 640 hours 40 minutes. |
| 27. Number of hours worked per day. | | 8. | Average, 6 hours 54 minutes. |
| 28. Number of holes. | | 125. | 3,610. |
| 29. Linear feet drilled (total). | | 541.5. | 22,354.3. |
| 30. Linear feet drilled per hour with one drill. | | Average, 1.8. | Average, 6.4. |
| 31. Average depth of holes. | | 4 feet 4 inches. | 6.13 feet. |
| 32. Distance between holes. | | 5 feet. | 5 feet. |
| 33. Distance between rows of holes. | | Do. | Do. |
| 34. Pounds of powder per hole. | | 11. | Average, 10.58. |
| 35. Cubic yards of rock removed. | | | |
| COSTS. | | | |
| 36. Pay roll. | | \$688.88 | 9,545.26 |
| 37. Subsistence. | | 267.88 | 2,960.41 |
| 38. Repairs. | | 261.23 | 3,274.70 |
| 39. Alterations and additions. | | 362.57 | 905.60 |
| 40. Fuel. | | 295.70 | 4,293.30 |
| 41. Dynamite. | | 237.75 | 4,163.55 |
| 42. Supplies. | | 317.55 | 1,773.72 |
| 43. Miscellaneous. | | 5.48 | 1,135.74 |
| 44. Office expenses. | | | 2,453.35 |
| 45. Tug expenses. | | | 4.00 |
| 46. Barge expenses. | | | |
| 47. Dredging rock (proportionate charge). | | | |
| 48. Total. | | \$2,357.04 | \$31,464.64 |

TABLE XII.—Report of operations of drill boats for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name..... | No. 16. | No. 25, Hudson River. | No. 30, Hudson River. |
|--|--|--|--|
| MISCELLANEOUS DATA. | | | |
| 49. Cost of coal per ton and number of tons purchased..... | | \$235.70..... | Average, \$4.81 per gross ton; 674 gross tons. |
| 50. Cost of dynamite per pound and number of pounds purchased..... | | 25 cents; 961 pounds..... | Average, \$0.2137; 39,214 pounds. |
| 51. Cost per cubic yard of rock removed..... |  | ..... | None. |
| 52. Distance rock was moved, in miles..... |  | ..... |  |
| 53. Cubic yards of rock removed per day..... |  | ..... |  |
| 54. Cost per foot of drilling rock..... |  | ..... | \$1.41. |
| 55. Number of linear feet of rock drilled per day..... | | 4.35..... | 87.9. |
| 56. Cost of operating drill boat per working day..... | | \$39.284..... | \$123.35, average. |
| | Remarks. | Remarks. | Remarks. |
| | This plant was used as a quarter boat for the crew operating the drilling barge No. 46 on the Flint River, Ga. | Used on Harlem River and Mamaroneck Harbor. This plant is a scow rigged with a two-drill equipment in October, 1916. Above data shows her operation only as a drill boat Oct. 16 to Dec. 31. | Operated on upper Hudson River, Harlem River, and East Chester Creek, N. Y.
1 Former drill boat Hudson was rebuilt as a 2-unit drill boat on scow of form concrete mixer No. 13, U. S. E. D., H. R.
2 Estimated value of parts taken from old plant. |

| 1. Name. | Drill used No. 58.1 | | No. 48. | Drill boat No. 482. |
|---------------------------|---|--|---|--|
| | Barge No. 68. | Raft No. 58. | | |
| 2. District. | Chatanooga, Tenn. | Chatanooga, Tenn. | Montgomery, Ala. | Rock Island, Ill. |
| 3. Where built. | do. | Coulter Island Shoals. | Apalachicola, Fla. | Hull at La Claire, Iowa, remainder at |
| 4. When built. | 1912 | 1916 | 1915 | 1912 |
| 5. Builder. | U. S. Engineer Department. | U. S. Engineer Department. | S. J. Johnson. | Milwaukee Bridge Co. |
| 6. Time to build. | 30 days. | 30 days. | No record | 7 months |
| 7. Cost of hull. | \$1,724.63 | \$1,024.76 | \$2,750 | \$11,877.08 |
| 8. Cost of machinery. | \$800 | \$800 | \$1,143 | \$23,718.77 |
| 9. Total cost. | \$2,524.63 | \$2,024.76 | \$3,893 | \$35,595.85, including outfit. |
| 10. Present value. | \$1,946 | \$2,000 | \$3,100 | \$15,273.92 |
| 11. Details. | <p>(a) Material.</p> <p>(b) Length.</p> <p>(c) Beam.</p> <p>(d) Depth.</p> <p>(e) Draft forward.</p> <p>(f) Draft aft.</p> <p>(g) Displacement (long tons).</p> | <p>Wood</p> <p>80 feet 6 inches.</p> <p>20 feet.</p> <p>4 feet 6 inches.</p> <p>1 foot 6 inches.</p> <p>1 foot 8 inches.</p> <p>63.94.</p> | <p>Wood</p> <p>80 feet.</p> <p>24 feet.</p> <p>4 feet.</p> <p>9 inches.</p> <p>6 inches.</p> <p>40.</p> | <p>Steel</p> <p>123 feet.</p> <p>22 feet.</p> <p>6 feet.</p> <p>Starboard side 32 inches, port 29 inches.</p> <p>Do.</p> <p>272.</p> |
| 12. Drills. | (a) Make. | Ingersoll-Rand & Sullist. | Little Giant (Chicago Pneumatic Tool Co.) | Ingersoll-Rand. |
| | (b) Type (give manufacturer's number). | D-24; F. L. 3. | B 685-680. | H-44. |
| | (c) Number on boat. | 5. | 2. | 4. |
| | (d) Piston diameter. | 21 inches. | 21 inches. | 21 inches. |
| | (e) Stroke. | 24 inches. | 24 inches. | 24 inches. |
| | (f) Feed. | 6 inches. | 6 inches. | 6 inches. |
| | (g) Chuck. | Wood, shifted by hand. | Wood pattern; drills shifted on tripods. | Steel; shifted by steam engine. |
| | (h) Number of strokes per minute. | Wood, shifted by hand. | Wood pattern; drills shifted on tripods. | Steel; shifted by steam engine. |
| | (i) Material of drill frame and how shifted along boat. | Wood, shifted by hand. | Wood pattern; drills shifted on tripods. | Steel; shifted by steam engine. |
| | (j) Diameter of bit. | 14 inches, 1 inch. | 1 inch. | 14 inches. |
| | (k) Type of bit. | Cross. | 14 inches. | 14 inches. |
| | (l) Size of lat pump. | 2 inches. | Steel cross. | Octagon with cross bit. |
| | (m) Working pressure. | 120 pounds. | None. | 10 by 7 by 10 inches. |
| | (n) Number of jets. | 2. | 2. | 150 pounds. |
| | (o) Diameter of jets. | 2 inches. | 2 inches. | 4 inches. |
| | (p) Number of spuds. | 10. | 2. | 4 inches. |
| 13. Number of spuds. | | 6 by 6 inches by 12 feet. | 12 by 12 inches. | 16 by 16 inches by 22 feet. |
| 14. Size of spuds. | | 6 by 6 inches by 12 feet. | 6 by 6 inches, double cylinder. | 7 by 9 double cylinder. |
| 15. Size of spud engines. | | | | |

TABLE XII.—Report of operations of drill boats for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name..... | Drill unit No. 36. ¹ | | No. 48. | Drill boat No. 488. |
|--|---------------------------------|--------------|--|--|
| | Barge No. 68. | Raft No. 38. | | |
| 16. Boiler: | Locomotive fire tube..... | | Upright..... | 3 Mississippi River, five 9-inch flues. |
| (a) Type..... | | | 46 inches..... | Three, 40½ inches each. |
| (b) Diameter..... | | | 90 inches..... | Three, 20 feet 2½ inches each. |
| (c) Length..... | | | 240 square feet..... | Three, 8 feet 6 inches. |
| (d) Height..... | | | 8.75 square feet..... | 1,166 square feet. |
| (e) Heating surface..... | | | 90 pounds..... | 56 square feet. |
| (f) Grate surface..... | | | 9..... | 166 pounds. |
| (g) Working pressure..... | | | 1..... | 16. |
| 17. Number of men in crew..... | | | No. 16..... | 1 coal barge (No. 288), 1 quarter boat (No. 506). |
| 18. Number of barges..... | | | None..... | 1 magazine boat (No. 511), 2 loading boats (No. 428, 1-2). |
| 19. Identifying numbers of barges..... | | | Dredge Upatol..... | Ruth. |
| 20. Name of tug..... | | | | St. Paul. |
| 21. Name of dipper dredge to which drill boat is attached. | Nollchucky..... | | | |
| OPERATOR. | | | | |
| 22. Character of material..... | Limestone..... | | Rock..... | |
| 23. Average depth of water..... | 35..... | | 2.3 feet..... | |
| 24. Number of days worked..... | 283..... | | 130 days..... | |
| 25. Number of hours worked..... | 227..... | | 1,040..... | |
| 26. Number of hours delay..... | 7.2..... | | 836..... | |
| 27. Number of hours worked per day..... | 495..... | | 8..... | |
| 28. Number of holes..... | 4,020..... | | 2,014..... | |
| 29. Linear feet drilled (total)..... | 15.9..... | | 14,383..... | |
| 30. Linear feet drilled per hour with one drill..... | 8.1..... | | 6.55..... | |
| 31. Average depth of holes..... | | | 7 feet..... | |
| 32. Distance between holes..... | | | 8 feet..... | |
| 33. Distance between rows of holes..... | | | 6 feet..... | |
| 34. Pounds of powder per hole..... | | | 2.8 pounds..... | |
| 35. Cubic yards of rock removed..... | | | Included in material dredged; no dry blasting. | |

| Costs. | | (1) | | Remarks. |
|--|--|---|--|--|
| 36. Pay roll..... | \$1,054.22 | ..... |  |  |
| 37. Subsidence..... | \$292.54 | ..... |  |  |
| 38. Repairs..... | ..... | ..... |  |  |
| 39. Alterations and additions..... | ..... | ..... |  |  |
| 40. Fuel..... | 87.20 | ..... |  |  |
| 41. Dynamite..... | 632.25 | ..... |  |  |
| 42. Supplies..... | 470.83 | ..... |  |  |
| 43. Miscellaneous..... | ..... | ..... |  |  |
| 44. Office expenses..... | \$ 371.28 | ..... |  |  |
| 45. Tug expenses..... | 729.85 | ..... |  |  |
| 46. Barge expenses..... | ..... | ..... |  |  |
| 47. Dredging rock (proportionate charge). | ..... | ..... |  |  |
| 48. Total..... | \$3,600.27 | ..... |  |  |
| MISCELLANEOUS DATA. | | | | |
| 49. Cost of coal per ton and number of tons purchased. | \$3.45; 29.3 tons used. | Included in fuel account of dredge..... | | |
| 50. Cost of dynamite per pound and number of pounds purchased. | 25 cents; 2,529 pounds used. | \$0.208; 7,715 pounds..... | | |
| 51. Cost per cubic yard of rock removed. | 75 cents. | ..... |  |  |
| 52. Distance rock was moved, in miles. | 68 blasted *. | ..... |  |  |
| 53. Cubic yards of rock removed per day. | 89.5 cents. | ..... |  |  |
| 54. Cost per foot of drilling rock. | 57.5 *. | 109.7 feet..... | | |
| 55. Number of linear feet of rock drilled per day. | \$102.86 *. | ..... |  |  |
| 56. Cost of operating drill boat per working day. | Coulter Island Shoals, Tennessee River.
* The outfit consists of barge mounted with boiler, for furnishing steam and handling drills, and raft for supporting drills.
* To a depth of 1 foot below grade.
* Includes field and Nashville office charges.
* Per aggregate 8-hour shift actually worked. | This plant was operated during the year in connection with the dredge Upatoi and its cost is included in the cost of dredging.
* Included in cost of operation of dredge Upatoi. | | Mississippi River, Rock Island Division, Idle at Moline, Ill., all season. |

TABLE XIII.

MANEUVER BOATS.

4373

TABLE XIII.—*Report of operations of maneuver boats for the calendar year ending Dec. 31, 1916.*

| 1. Name. | No Name. | No. 1. | No. 1. | No. 1 (Arapahoe River). | No. 1 (Ohio River). |
|------------------------------|---|---|---------------------------------|-------------------------|-------------------------|
| 2. District. | First, Cincinnati, Ohio. | Charleston, S. C. | Louisville, Ky. | Pittsburgh, Pa. | Pittsburgh, Pa. |
| 3. Where built. | Elizabeth, Pa. | United States Lock, Conger River, S. C. | do. | do. | Look 4, Pa. |
| 4. When built. | 1910. | 1911-12. | 1912. | 1902. | 1906. |
| 5. Builder. | Mongomahala River Coal & Coke Co. | United States. | United States. | United States. | United States. |
| 6. Time to build. | 49 days. | Building during 7 months, not continuously. | 3 months. | | |
| 7. Material of hull. | Wood. | Long-leaf pine. | Yellow pine, metal sheathed. | Wood. | Wood. |
| 8. Cost of hull. | \$2,311. | \$2,940.04. | \$4,104.52. | | \$5,600. |
| 9. Cost of machinery. | \$3,863.91. | \$2,460. | \$3,350.50. | | 60 feet. |
| 10. Total cost. | \$6,174.91. | \$5,400.04. | \$7,455.02. | | 56 feet. |
| 11. Length. | 75 feet. | 60 feet. | 73 feet 7 inches. | | 23 feet. |
| 12. Beam. | 22 feet. | 22 feet. | 22 feet 5 inches. | | 3 feet. |
| 13. Depth. | 3 feet 3 inches. | 3 feet 5 inches. | 4 feet 5 inches. | | 1 foot 7 inches. |
| 14. Draft forward. | 1 foot 10 inches. | 1 foot 10 inches. | 1 foot 9 inches. | | 1 foot 7 inches. |
| 15. Draft aft. | 1 foot 9 inches. | 1 foot 6 inches. | 1 foot 9 inches. | | 1 foot 9 inches. |
| 16. Displacement. | 71 tons. | 56.8 tons. | 71½ long tons. | | 70 tons. |
| 17. Mast: | | | | | |
| (a) Height. | 21 feet. | 21 feet. | 20 feet 6 inches. | | 20 feet 9 inches. |
| (b) Dimensions. | 12 by 12 inches. | 13 by 12 inches. | Two 10-inch, 20-pound channels. | | 7 inches diameter. |
| 18. Boom: | | | | | |
| (a) Length. | 25 feet. | 35 feet. | 24 feet. | | 25 feet (white pine) |
| (b) Dimensions. | Ends, 10 by 10 inches; center, 12 by 12 inches. | 10 by 12 inches. | Two 10-inch, 20-pound channels. | | 9 by 9 inches. |
| (c) How braced. | No braces. | No bracing. | Stiff legs. | | No braces. |
| (d) Capacity in tons. | 7. | 8. | 6. | | No braces. |
| 19. Bull-wheel diameter. | 8 feet. | 12 feet. | 10 feet. | | |
| 20. Buckets: | | | | | |
| (a) Type. | None. | Clamshell. | | | |
| (b) Capacity. | None. | ¾ yard. | | | |
| 21. Hoisting engine: | | | | | |
| (a) Make. | Lidgerwood. | Mundy. | Clyde. | | Thos. Carlin's Sons Co. |
| (b) Number of drums. | 3. | 3. | 3. | | 2. |
| (c) Dimensions of cylinders. | 9 by 10 inches. | 9 by 10 inches. | 8½ by 10 inches. | | 8 by 10 inches. |
| (d) Diameter of rope. | ¾ inch. | ¾ inch. | ¾ inch. | | ¾-inch wire. |

TABLE XIII.—Report of operations of maneuver boats for the calendar year ending Dec. 31, 1916—Continued.

| No. 1. | No. 2. | No. 3 (Ohio River). | No. 4 (Ohio River). | No. 5 (Ohio River). |
|------------------------------|--------------------------------|---------------------------------|---------------------------------|---|
| 1. Name. | Louisville, Ky. | Pittsburgh, Pa. | Pittsburgh, Pa. | Pittsburgh, Pa. |
| 2. District. |do. |do. |do. |do. |
| 3. Where built. | 1912. | 1914. | 1908. | 1908. |
| 4. When built. | United States | American Bridge Co. | United States | United States. |
| 5. Builder. | 3 months. | Steel. | Wood. | Wood. |
| 6. Time to build. | Yellow pine, metal sheathed. | | | |
| 7. Material of hull. | \$4,104.52. | | | |
| 8. Cost of hull. | \$7,435.03. | \$8,250. | \$8,000. | \$4,250. |
| 9. Cost of machinery. | 73 feet 7 inches. | 60 feet. | 60 feet. | 60 feet. |
| 10. Total cost. | 22 feet 6 inches. | 22 feet. | 22 feet. | 22 feet. |
| 11. Length. | 4 feet 9 inches. | 3 feet 3 inches. | 3 feet 8 inches. | 3 feet 8 inches. |
| 12. Beam. | 22 feet 6 inches. | 1 foot 11 inches. | 2 feet 8 inches. | 2 feet 1 inch. |
| 13. Depth. | 1 foot 9 inches. | 2 feet 3 inches. | 2 feet 10 inches. | 1 foot 5 inches. |
| 14. Draft forward. | 1 foot 8 inches. | 76 tons. | 54 tons. | 65 tons. |
| 15. Draft aft. | 71½ long tons. | 20 feet. | 20 feet. | 20 feet 6 inches. |
| 16. Displacement. | 20 feet 6 inches. | 14 by 14 inches. | 14 by 14 inches. | 12 by 12 inches. |
| 17. Mast: | Two 10-inch 20-pound channels. | | | |
| (a) Height. | | | | |
| (b) Dimensions. | | | | |
| 18. Boom: | 34 feet. | 35 feet. | 50 feet. | 33 feet. |
| (a) Length. | Two 10-inch 20-pound channels. | 12 by 12 inches. | 12 by 12 inches. | 10 by 10 inches. |
| (b) Dimensions. | Stiff legs. | | Stiff leg. | 2, also 23 feet 4 inches; 4 stiff legs, 31 feet 8 inches by 8 inches. |
| (c) How braced. | | | | 4. |
| (d) Capacity in tons. | 6. | 8. | 4. | |
| 19. Bull-wheel diameter. | 10 feet. | | | |
| 20. Bucket: | | | | |
| (a) Type. | Class E, Hayward clamshell. | | | |
| (b) Capacity. | 1 cubic yard. | | | |
| 21. Hoisting engine: | | | | |
| (a) Make. | Clyde. | | | |
| (b) Number of drums. | 2. | | | |
| (c) Dimensions of cylinders. | 8½ by 10 inches. | Thos. Carlin's Sons Co. | Ladgarwood. | Mundy. |
| (d) Diameter of rope. | 4 inch. | 3. | 3. | 3. |
| (e) Make. | Clyde. | 8 by 10 inches. | 9 by 10 inches. | 8 by 12 inches. |
| (f) Number of drums. | 2. | 4. | 4. | 4. |
| (g) Dimensions of cylinders. | 6½ by 8 inches. | 4-inch boom line; 4-inch hoist. | 4-inch boom line; 4-inch hoist. | 4-inch. |
| (h) Diameter of rope. | 4 inch. | | | |

| | | | | | |
|---|------------------|---|---|--|--|
| 23. Boiler: | 10 feet. | 116 inches. | 101 inches. | 108 inches. | 102 inches. |
| (a) Height. | 4 feet. | 54 inches. | 48 inches. | 48 inches. | 48 inches. |
| (b) Diameter. | 564 square feet. | 184 2-inch tubes, 85 inches long. | 180 2-inch tubes, 73 inches long. | 147 2-inch tubes, 76 inches long. | 142 2-inch tubes, 76 inches long. |
| (c) Heating surface. | | 126 pounds. | 100 pounds. | 100 pounds. | 100 pounds. |
| (d) Working pressure. | | | | | |
| OPERATING COST. | | | | | |
| 24. Pay roll. | \$4,459.67 | \$700.00 | \$1,178.00 | \$1,100.00 | \$900.00 |
| 25. Supplies. | | 100.00 | 100.00 | 285.00 | 284.00 |
| 26. Repairs: | | | | | |
| (a) Hull. | 1,022.09 | | 2,765.00 | 2,500.00 | 2,785.00 |
| (b) Machinery. | 378.45 | | 108.74 | 285.00 | 487.00 |
| (c) Miscellaneous. | 9.06 | | | | |
| 27. Miscellaneous. | | | | | |
| 28. Total. | \$6,631.23 | \$860.00 | \$4,181.74 | \$4,180.00 | \$4,426.00 |
| 29. Number of men in crew. | | | | | |
| 30. Work done during the year and where operated. | See Remarks. | 9 when raising or lowering dam.
Dam No. 2, Ohio River. | 7 when raising and lowering dam.
At Dam 3, Ohio River. | 8 when raising or lowering dam.
Dam 4, Ohio River. | 8 when raising or lowering the dam.
Dam 5, Ohio River. |
| | | Remarks. | Remarks. | Remarks. | Remarks. |
| | | Employed at Louisville and Portland Canal, maneuvering dam, unloading coal, handling construction materials, etc. | Worked at cofferdam at upper gate and on valves on river wall; also moved wickets and horses. Raised and lowered the dam three times during the year. | Repairing valves on river wall and placing new tracts under lower gate; placing bands around lower end of river wall and handling material and stone around dam. Raised and lowered the dam twice during the year. | The dam was raised and lowered three times, and on three occasions part of wickets were raised and lowered during the year. Used in making miscellaneous repairs to dam and lock, loading signal towers, handling needles and driftwood, and loading riprap stone. |

TABLE XIII.—*Report of operations of maneuver boats for the calendar year ending Dec. 31, 1916—Continued.*

| 1. Name..... | No. 6 (Ohio River). | No. 7 (Ohio River). | No. 8 (Ohio River). | No. 9 (Ohio River). | No. 10 (Ohio River). |
|----------------------------------|------------------------------|-------------------------|--|-------------------------|-----------------------------|
| 2. District..... | Pittsburgh, Pa. | Pittsburgh, Pa. | Pittsburgh, Pa. | Pittsburgh, Pa. | Pittsburgh, Pa. |
| 3. Where built..... | Look 4, Pa. | do. | do. | do. | Do. |
| 4. When built..... | 1904. | 1914. | 1910. | 1914. | 1916. |
| 5. Builder..... | United States. | American Bridge Co. | Thos. Carlin's Sons Co. | American Bridge Co. | Union Foundry & Machine Co. |
| 6. Time to build..... | Wood. | Steel. | 6 months. | Steel. | 10 months. |
| 7. Material of hull..... | Wood. | Steel. | Wood. | Steel. | Steel. |
| 8. Cost of hull..... | — | — | — | — | — |
| 9. Cost of machinery..... | — | — | — | — | — |
| 10. Total cost..... | \$4,400. | \$8,320. | \$6,101. | \$8,320. | \$4,940. |
| 11. Length..... | 56 feet. | 60 feet. | 60 feet. | 60 feet. | \$1,762. |
| 12. Beam..... | 18 feet. | 22 feet. | 22 feet. | 22 feet. | \$6,702. |
| 13. Depth..... | 3 feet. | 3 feet 8 inches. | 3 feet 8 inches. | 3 feet 8 inches. | 23 feet. |
| 14. Draft forward..... | 1 foot 6 1/2 inches. | 1 foot. | 1 foot 8 inches. | 1 foot 11 inches. | 3 feet 8 inches. |
| 15. Draft aft..... | 1 foot 11 inches. | 2 feet 3 inches. | 2 feet 1 inch. | 2 feet 3 inches. | 2 feet 1 inch. |
| 16. Displacement..... | 41 tons. | 76 tons. | 65 tons. | 76 tons. | 2 feet 4 inches. |
| 17. Mast: | | | | | 57 tons. |
| (a) Height..... | 22 feet 6 inches. | 20 feet. | 21 feet. | 20 feet. | 20 feet. |
| (b) Dimensions..... | 8 1/4 by 9 inches. | 14 by 14 inches. | 12 by 12 inches. | 14 by 14 inches. | 14 by 14 inches. |
| 18. Boom: | | | | | |
| (a) Length..... | 32 feet 6 inches. | 35 feet. | 25 feet. | 25 feet. | 25 feet. |
| (b) Dimensions..... | 8 by 8 inches. | 12 by 12 inches. | 10 by 12 inches. | 12 by 12 inches. | 12 by 12 inches. |
| (c) How braced..... | Stiff legs and chain guys. | None. | Front legs secured to steel posts, rear legs secured to gunwale with steel plates. | None. | Not braced. |
| (d) Capacity in tons..... | 2. | 8. | 4. | 8. | 11. |
| 19. Bull-wheel diameter..... | | | | | |
| 20. Buckets: | | | | | |
| (a) Type..... | | | | | |
| (b) Capacity..... | | | | | |
| (c) Material..... | | | | | |
| (d) Make..... | | | | | |
| 21. Hoisting engine: | American Hoist & Derrick Co. | Thos. Carlin's Sons Co. | Thos. Carlin's Sons Co. | Thos. Carlin's Sons Co. | Thos. Carlin's Sons Co. |
| (a) Number of drums..... | 2, fast and slow gear. | 3. | 3. | 3. | 3. |
| (b) Dimensions of cylinders..... | 6 1/4 by 10 inches. | 9 by 10 inches. | 10 by 12 inches. | 9 by 10 inches. | 9 by 10 inches. |
| (c) Diameter of rope..... | 1/2 inch. | 1/2 inch. | 1/2 inch. | 1/2 inch. | 1/2 inch. |
| 22. Swinging engine: | | | | | |
| (a) Make..... | | | | | |
| (b) Number of drums..... | | | | | |
| (c) Dimensions of cylinders..... | | | | | |
| (d) Diameter of rope..... | | | | | |

| | | | | | |
|---|--|--|--|---|---|
| 23. Boiler: | 109 inches..... | 117 inches..... | 101 inches..... | 117 inches..... | 117 inches..... |
| (a) Height..... | 30 inches..... | 54 inches..... | 57 inches..... | 54 inches..... | 54 inches..... |
| (b) Diameter..... | 90 2-inch tubes, 96 inches long..... | 186 2-inch tubes, 84 inches long..... | 126 2-inch tubes, 73 inches long..... | 186 2-inch tubes, 84 inches long..... | 186 2-inch tubes, 86 inches long..... |
| (c) Heating surface..... | 100 pounds..... | 100 pounds..... | 100 pounds..... | 100 pounds..... | 126 pounds..... |
| (d) Working pressure..... | | | | | |
| OPERATING COST. | | | | | |
| 24. Pay roll..... | \$475.00 | \$354.67 | \$494.00 | \$274.60 | \$1,085.06 |
| 25. Supplies..... | 75.00 | 61.00 | 48.80 | 204.65 | 255.22 |
| 26. Repairs: | | | | | |
| (a) Hull..... | 285.00 | 13.57 | 285.00 | 5.00 | ..... |
| (b) Machinery..... | 350.00 | ..... | ..... | ..... | ..... |
| 27. Miscellaneous..... | ..... | ..... | ..... | ..... | ..... |
| Total..... | \$1,185.00 | \$431.24 | \$817.30 | \$1,274.25 | \$1,341.28 |
| 28. Number of men in crew..... | 8 when raising and lowering dam. | 8 when raising and lowering dam. | 10 when raising and lowering the dam. | 8 when raising and lowering dam. | 8 when raising and lowering dam. |
| 29. Work done during the year and where operated. | Dam No. 6, Ohio River..... | Dam 7, Ohio River..... | Dam 8, Ohio River..... | Dam 9, Ohio River..... | Dam 10, Ohio River. |
| | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> |
| | The dam was raised and lowered once during the year, also portion of wickets at different times and other miscellaneous work done. | Dam was raised and lowered once during the year and at various times parts of wickets; also raised service bridge once and wicket twice, and did other miscellaneous work. | The dam was raised and lowered once during the year and other miscellaneous work was done. | The dam was raised and lowered twice during the year, steam furnished for drilling operations, raised and lowered the weir, and other miscellaneous work. | Raised and lowered the dam once and part of wickets several times during the year and did other miscellaneous work. |

TABLE XIII.—*Report of operations of maneuver boats for the calendar year ending Dec. 31, 1916—Continued.*

| 1. Name..... | No. 10, U. S. E. D. Wheeling. | No. 11, U. S. E. D. Wheeling. | No. 22, U. S. E. D. Wheeling. | No. 23, U. S. E. D. Wheeling. | No. 24, U. S. E. D. Wheeling. |
|----------------------------------|---|--|--|-------------------------------|-------------------------------|
| 2. District..... | Wheeling, W. Va. | Wheeling, W. Va. | Wheeling, W. Va. | Wheeling, W. Va. | Wheeling, W. Va. |
| 3. Where built..... | Elizabeth, Pa. | Elizabeth, Pa. | Freedom, Pa. | Freedom, Pa. | Pittsburgh, Pa. |
| 4. When built..... | 1909. | 1909. | 1910. | 1910. | 1915. |
| 5. Builder..... | Monongahela River Consolidated Coal & Coke Co. | The Monongahela River Consolidated Coal & Coke Co. | Thomas Carlin's Sons Co. | Thomas Carlin's Sons Co. | American Bridge Co. |
| 6. Time to build..... | 2 months. | 2 months. | 4 months. | 192 days. | 6 months. |
| 7. Material of hull..... | Wood. | Wood. | Wood. | Wood. | Steel. |
| 8. Cost of hull..... | \$3,800. | \$6,200 complete. | Hull and machinery purchased for a lump sum. | \$5,200. | \$6,250. |
| 9. Cost of machinery..... | \$1,304.35. | Included in above. | | | \$3,570.25. |
| 10. Total cost..... | \$5,104.35. | \$6,200. | \$5,200. | | \$9,820.25. |
| 11. Length..... | 60 feet. | 60 feet. | 60 feet. | 60 feet. | 60 feet. |
| 12. Beam..... | 22 feet. | 22 feet. | 22 feet. | 22 feet. | 22 feet. |
| 13. Depth..... | 3 feet 8 inches. | 3 feet 8 inches. | 3 feet 8 inches. | 3 feet 8 inches. | 3 feet 2 inches. |
| 14. Draft forward..... | 1 foot 9 inches. | 2 feet 2 inches. | 1 foot 6 inches. | 1 foot 6 inches. | 2 feet. |
| 15. Draft aft..... | 2 feet. | 1 foot 11 inches. | 1 foot 6 inches. | 1 foot 6 inches. | 2 feet 5 inches. |
| 16. Displacement..... | 70 long tons. | 70 tons. | 70 tons. | 70 tons. | 52 long tons. |
| 17. Mast: | | | | | |
| (a) Height..... | 21 feet. | 21 feet. | 21 feet. | 21 feet. | 19 feet 6 inches. |
| (b) Dimensions..... | 12 by 12 inches. | 12 by 12 inches. | 12 by 12 inches. | 12 by 12 inches. | 14 by 14 inches. |
| 18. Boom: | | | | | |
| (a) Length..... | 35 feet. | 38 feet. | 35 feet. | 35 feet. | 35 feet. |
| (b) Dimensions..... | 10 by 12 inches. | 12 by 10 inches. | 10 by 12 inches. | 12 by 12 inches. | 12 by 12 inches. |
| (c) How braced..... | None. | None. | Not braced. | Not braced. | Not braced. |
| (d) Capacity in tons..... | 6. | 6. | 6. | 5. | 6. |
| 19. Bull-wheel diameter..... | None. | None. | None. | None. | None. |
| 20. Bucket: | | | | | |
| (a) Type..... | do. | Clamshell. | do. | do. | Do. |
| (b) Capacity..... | 1/2 yard. | 1/2 yard. | do. | do. | do. |
| 21. Hoisting engine: | | | | | |
| (a) Make..... | J. S. Mundy Engine Co. | J. S. Mundy. | Thomas Carlin's Sons Co. | Thomas Carlin's Sons Co. | Thomas Carlin's Sons Co. |
| (b) Number of drums..... | 3. | 3. | 3. | 3. | 3. |
| (c) Dimensions of cylinders..... | 7 1/2 by 10 inches. | 8 1/2 by 12 inches. | 9 by 10 inches. | 9 by 10 inches. | 9 by 10 inches. |
| (d) Diameter of rope..... | 1/2 inch for boom and fall; 1/2 inch for wicket line. | Boom, 1/2 inch; main fall, 1/2 inch. | 1/2 and 1/2 inch. | 1/2 inch. | 1/2 inch. |
| 22. Swinging engine: | | | | | |
| (a) Make..... | None. | None. | None. | None. | None. |
| (b) Number of drums..... | None. | None. | None. | None. | None. |
| (c) Dimensions of cylinders..... | None. | None. | None. | None. | None. |
| (d) Diameter of rope..... | None. | None. | None. | None. | None. |

| | | | | |
|---|---|---|---|---|
| 23. Boiler: | 7 feet 6 inches | 8 feet 6 inches | 8 feet 6 inches | 10 feet 6 inches. |
| (a) Height..... | 40 inches..... | 48 inches..... | 48 inches..... | 3 feet 9 inches..... |
| (b) Diameter..... | 280 square feet..... | 360 square feet..... | 508 square feet..... | 684 square feet..... |
| (c) Heating surface..... | 100 pounds..... | 100 pounds..... | 100 pounds..... | 100 pounds..... |
| (d) Working pressure..... | | | | |
| OPERATING COST. | | | | |
| 24. Pay roll..... | \$10.00 | \$31.17 | \$43.50 | \$44.16 |
| 25. Supplies..... | | | | |
| 26. Repairs: | | | | |
| (a) Hull..... | 364.00 | 22.27 | 25.20 | 17.30 |
| (b) Machinery..... | 96.26 | 44.00 | 7.60 | 210.77 |
| 27. Miscellaneous..... | | | | 40.77 |
| Total..... | \$470.26 | \$57.44 | \$76.30 | \$313.00 |
| 28. Number of men in crew..... | | (1) Maneuvering Dam No. 18, | (1) Operating wickets, Dam | (1) Maneuvering Dam No. 28, |
| 29. Work done during the year and where operated. | Maneuvering Dam No. 13, Ohio River. | Ohio River. | No. 26, Ohio River. | Ohio River. |
| | Remarks. | Remarks. | Remarks. | Remarks. |
| | No regular crew; operated by lock force. | ¹ No regular crew; operated by lock employees. | ¹ No regular crew; operated by lock employees. | ¹ No regular crew; operated by lock employees. |
| | In addition to maneuvering the dam, the boat moved about 1,000 yards of earth, sand, and gravel in excavating and filling back of lower guide wall of the lock. | | | |

TABLE XIII.—*Report of operations of maneuver boats for the calendar year ending Dec. 31, 1916—Continued.*

| | No. 37, U. S. E. D. Wheeling. | No. 38. | No. 38, U. S. E. D. Wheeling. | No. 39. | No. 39, U. S. E. D. Wheeling. |
|--|--|--|--|--|--|
| 1. Name..... | Wheeling, W. Va.
Pittsburgh, Pa.
1915-16.
Union Foundry & Machine Co. | Second, Cincinnati, Ohio
Louis, Ky.
1911.
Union Foundry & Machine Co. | Wheeling, W. Va.
Pittsburgh, Pa.
1915-16.
Union Foundry & Machine Co. | Second, Cincinnati, Ohio
Louis, Ky.
1911.
Union Foundry & Machine Co. | Wheeling, W. Va.
Pittsburgh, Pa.
1915-16.
Union Foundry & Machine Co. |
| 2. District..... | | | | | |
| 3. Where built..... | | | | | |
| 4. When built..... | | | | | |
| 5. Builder..... | | | | | |
| 6. Time to build..... | 11 months. | 4 months. | 11 months. | 3 months. | 11 months. |
| 7. Material of hull..... | Steel. | Wood. | Steel. | Wood. | Steel. |
| 8. Cost of hull..... | \$4,940. | \$2,838.83. | \$4,940. | \$1,786.66. | \$4,940. |
| 9. Cost of machinery..... | \$3,643.11. | \$2,226.96. | \$3,643.11. | \$1,611.22. | \$3,643.11. |
| 10. Total cost..... | \$8,583.11. | \$5,065.69. | \$8,583.11. | \$3,397.87. | \$8,583.11. |
| 11. Length..... | 60 feet. | 65 feet. | 60 feet. | 60 feet. | 60 feet. |
| 12. Beam..... | 22 feet. | 30 feet. | 22 feet. | 26 feet. | 22 feet. |
| 13. Depth..... | 3 feet 8 inches. | 5 feet 2 inches. | 3 feet 8 inches. | 3 feet 4 inches. | 3 feet 8 inches. |
| 14. Draft forward..... | 2 feet. | 1 foot 5 inches. | 2 feet. | 9 inches. | 2 feet. |
| 15. Draft aft..... | 2 feet 5 inches. | 1 foot 5 inches. | 2 feet 5 inches. | 1 foot 2 inches. | 2 feet 5 inches. |
| 16. Displacement..... | 82 tons. | 65 tons. | 82 tons. | 50 tons. | 82 tons. |
| 17. Mast:
(a) Height..... | 20 feet. | 33 feet. | 20 feet. | 25 feet 6 inches. | 20 feet. |
| (b) Dimensions..... | 14 by 14 inches. | 14 by 14 inches. | 14 by 14 inches. | 14 by 14 inches. | 14 by 14 inches. |
| 18. Boom:
(a) Length..... | 35 feet. | 65 feet. | 35 feet. | 40 feet. | 35 feet. |
| (b) Dimensions..... | 12 by 12 inches. | 16 by 16 inches, tapered to 12 by 12 inches. | 12 by 12 inches. | 10 by 10 inches. | 12 by 12 inches. |
| (c) How braced..... | | Not braced. | None. | Not braced. | None. |
| (d) Capacity in tons..... | 6. | 7. | 6. | 4. | 6. |
| 19. Bull-wheel diameter..... | | 15 feet. | | 8 feet. | None. |
| 20. Rudder:
(a) Type..... | None. | Clamshell. | do. | None. | Do. |
| (b) Capacity..... | | 1 cubic yard. | | | |
| (c) Make..... | Lambert Hoisting Engine Co. | J. S. Mundy Engine Works. | Lambert Hoisting Engine Co. | J. S. Mundy Engine Works. | Lambert Hoisting Engine Co. |
| (b) Number of drums..... | 3. | 3. | 3. | 2. | 3. |
| (c) Dimensions of cylinders..... | 9 by 10 inches. | 7 by 12 inches. | 9 by 10 inches. | 6 by 12 inches. | 9 by 10 inches. |
| (d) Diameter of rope..... | 1 inch. | 1 inch. | 1 inch. | 1 inch. | 1 inch. |
| (e) Swinging engines:
(a) Make..... | None. | J. S. Mundy Engine Works. | None. | Attached to engine. | None. |
| (b) Number of drums..... | | 5 by 8 inches. | | None. | |
| (c) Dimensions of cylinders..... | | 1 inch. | | 1 inch. | |
| (d) Diameter of rope..... | | 1 inch. | | 1 inch. | |

FLOATING PLANT.

4888

| 23. Bolter: | 8 feet
(c) Height.....
(d) Diameter.....
(e) Heating surface.....
(f) Working pressure..... | 8 feet 6 inches.
48 inches.
480 square feet.
100 pounds. | 7 feet 6 inches.
3 feet 3 inches.
220 square feet.
100 pounds. | 8 feet 6 inches.
48 inches.
480 square feet.
125 pounds. |
|---|---|---|---|---|
| OPERATING COST. | | | | |
| 24. Pay roll..... | \$174 10 | | (1) \$4.00 | \$100.00 |
| 25. Supplies..... | 32.50 |  |  | ..... |
| 26. Repairs..... |  |  |  | ..... |
| (c) Fuel..... | | | (3) | ..... |
| (d) Machinery..... | \$32.00 | | (3) | ..... |
| 27. Miscellaneous..... |  |  |  | ..... |
| Total..... | \$228.50 | | No regular number..... | \$4.00 |
| 28. Number of men in crew..... | No regular crew; operated by lock force. | | | |
| 29. Work done during the year and where operated. | (1) | | | |
| 30. | | | | |
| 31. | | | | |
| 32. | | | | |
| 33. | | | | |
| 34. | | | | |
| 35. | | | | |
| 36. | | | | |
| 37. | | | | |
| 38. | | | | |
| 39. | | | | |
| 40. | | | | |
| 41. | | | | |
| 42. | | | | |
| 43. | | | | |
| 44. | | | | |
| 45. | | | | |
| 46. | | | | |
| 47. | | | | |
| 48. | | | | |
| 49. | | | | |
| 50. | | | | |
| 51. | | | | |
| 52. | | | | |
| 53. | | | | |
| 54. | | | | |
| 55. | | | | |
| 56. | | | | |
| 57. | | | | |
| 58. | | | | |
| 59. | | | | |
| 60. | | | | |
| 61. | | | | |
| 62. | | | | |
| 63. | | | | |
| 64. | | | | |
| 65. | | | | |
| 66. | | | | |
| 67. | | | | |
| 68. | | | | |
| 69. | | | | |
| 70. | | | | |
| 71. | | | | |
| 72. | | | | |
| 73. | | | | |
| 74. | | | | |
| 75. | | | | |
| 76. | | | | |
| 77. | | | | |
| 78. | | | | |
| 79. | | | | |
| 80. | | | | |
| 81. | | | | |
| 82. | | | | |
| 83. | | | | |
| 84. | | | | |
| 85. | | | | |
| 86. | | | | |
| 87. | | | | |
| 88. | | | | |
| 89. | | | | |
| 90. | | | | |
| 91. | | | | |
| 92. | | | | |
| 93. | | | | |
| 94. | | | | |
| 95. | | | | |
| 96. | | | | |
| 97. | | | | |
| 98. | | | | |
| 99. | | | | |
| 100. | | | | |

TABLE XIII.—*Report of operations of maneuver boats for the calendar year ending Dec. 31, 1916—Continued.*

| No. 40, U. S. E. D. Machine. | No. 45. | No. 46. | No. 47. |
|---|---|---|---|
| 1. Name..... | Second, Cincinnati, Ohio.
Hull at New Albany, Ind.; der-
rick at Louisville, Ky.
1913-14.
Hull, Chas. Hegewald Co.; der-
rick, United States.
6 months.
Steel.
\$2,897.
\$2,760.
\$252.
\$4,375.
60 feet.
26 feet.
3 feet 6 inches.
1 foot 2 inches.
1 foot 6 inches.
55 tons. | Second, Cincinnati, Ohio.
Hull at New Albany, Ind.; der-
rick at Louisville, Ky.
1913-14.
Hull, Chas. Hegewald Co.; der-
rick, United States.
6 months.
Steel.
\$2,897.
\$2,760.
\$252.
\$4,375.
60 feet.
26 feet.
3 feet 6 inches.
1 foot 2 inches.
1 foot 6 inches.
55 tons. | Second, Cincinnati, Ohio.
Hull at Jeffersonville, Ind.; der-
rick at Louisville, Ky.
1913-14.
Hull, Chas. Hegewald Co.; der-
rick, United States.
6 months.
Steel.
\$2,897.
\$2,760.
\$252.
\$4,375.
60 feet.
26 feet.
3 feet 6 inches.
1 foot 2 inches.
1 foot 6 inches.
55 tons. |
| 2. District..... | Wheeling, W. Va. | Second, Cincinnati, Ohio.
Hull at New Albany, Ind.; der-
rick at Louisville, Ky.
1913-14.
Hull, Chas. Hegewald Co.; der-
rick, United States.
6 months.
Steel.
\$2,897.
\$2,760.
\$252.
\$4,375.
60 feet.
26 feet.
3 feet 6 inches.
1 foot 2 inches.
1 foot 6 inches.
55 tons. | Second, Cincinnati, Ohio.
Hull at Jeffersonville, Ind.; der-
rick at Louisville, Ky.
1913-14.
Hull, Chas. Hegewald Co.; der-
rick, United States.
6 months.
Steel.
\$2,897.
\$2,760.
\$252.
\$4,375.
60 feet.
26 feet.
3 feet 6 inches.
1 foot 2 inches.
1 foot 6 inches.
55 tons. |
| 3. Where built..... | Pittsburgh, Pa. | Second, Cincinnati, Ohio.
Hull at New Albany, Ind.; der-
rick at Louisville, Ky.
1913-14.
Hull, Chas. Hegewald Co.; der-
rick, United States.
6 months.
Steel.
\$2,897.
\$2,760.
\$252.
\$4,375.
60 feet.
26 feet.
3 feet 6 inches.
1 foot 2 inches.
1 foot 6 inches.
55 tons. | Second, Cincinnati, Ohio.
Hull at Jeffersonville, Ind.; der-
rick at Louisville, Ky.
1913-14.
Hull, Chas. Hegewald Co.; der-
rick, United States.
6 months.
Steel.
\$2,897.
\$2,760.
\$252.
\$4,375.
60 feet.
26 feet.
3 feet 6 inches.
1 foot 2 inches.
1 foot 6 inches.
55 tons. |
| 4. When built..... | 1915-16. | 1913-14. | 1913-14. |
| 5. Builder..... | Union Foundry & Machine Co. | Hull, Chas. Hegewald Co.; der-
rick, United States.
6 months.
Steel.
\$2,897.
\$2,760.
\$252.
\$4,375.
60 feet.
26 feet.
3 feet 6 inches.
1 foot 2 inches.
1 foot 6 inches.
55 tons. | Hull, Chas. Hegewald Co.; der-
rick, United States.
6 months.
Steel.
\$2,897.
\$2,760.
\$252.
\$4,375.
60 feet.
26 feet.
3 feet 6 inches.
1 foot 2 inches.
1 foot 6 inches.
55 tons. |
| 6. Time to build..... | 11 months. | 6 months. | 6 months. |
| 7. Material of hull..... | Steel. | Steel. | Steel. |
| 8. Cost of hull..... | \$4,940. | \$2,897. | \$2,760. |
| 9. Cost of machinery..... | \$3,643.11. | \$2,239.25. | \$252. |
| 10. Total cost..... | \$8,583.11. | \$5,138.50. | \$4,375. |
| 11. Length..... | 60 feet. | 60 feet. | 60 feet. |
| 12. Beam..... | 22 feet. | 26 feet. | 26 feet. |
| 13. Depth..... | 3 feet 10 inches. | 4 feet 10 inches. | 3 feet 6 inches. |
| 14. Draft forward..... | 2 feet. | 1 foot 1 inch. | 1 foot 2 inches. |
| 15. Draft aft..... | 2 feet 5 inches. | 1 foot 10 inches. | 1 foot 6 inches. |
| 16. Displacement..... | 83 tons. | 75 tons. | 55 tons. |
| 17. Mast:
(a) Height.....
(b) Dimensions..... | 20 feet.
14 by 14 inches. | 35 feet.
13 by 20 and 13 by 14 inches at
base and top. | 28 feet 3 inches.
13 by 20 and 13 by 14 inches at
base and top. |
| 18. Boom:
(a) Length.....
(b) Dimensions.....
(c) How braced.....
(d) Capacity in tons.....
(e) Hull-wheel diameter.....
(f) Buckle..... | 35 feet.
12 by 12 inches.
Not braced.
6.
None. | 45 feet.
20 by 24 and 14 by 12 inches at
center and ends.
Not braced.
6.
12 feet. | 45 feet.
20 by 24 and 14 by 12 inches at
center and ends.
Not braced.
6.
12 feet. |
| 19. Bull-wheel diameter..... | None. | None. | None. |
| 20. Bucket:
(a) Type.....
(b) Capacity.....
(c) Hoisting engine:
(d) Make.....
(e) Number of drums.....
(f) Dimensions of cylinders.....
(g) Diameter of rope.....
(h) Swinging engine:
(i) Make.....
(j) Number of drums.....
(k) Dimensions of cylinders.....
(l) Diameter of rope..... | do.
1½ cubic yards.
Lambert Hoisting Engine Co.
8.
9 by 10 inches.
3 inch.
None.
None.
None.
None.
None.
None.
None. | do.
1½ cubic yards.
Lambert Hoisting Engine Co.
8.
9 by 10 inches.
3 inch.
None.
None.
None.
None.
None.
None.
None. | do.
1½ cubic yards.
Lambert Hoisting Engine Co.
8.
9 by 10 inches.
3 inch.
None.
None.
None.
None.
None.
None.
None. |
| 21. Hoisting engine:
(a) Make.....
(b) Number of drums.....
(c) Dimensions of cylinders.....
(d) Diameter of rope.....
(e) Swinging engine:
(f) Make.....
(g) Number of drums.....
(h) Dimensions of cylinders.....
(i) Diameter of rope..... | do.
1½ cubic yards.
Lambert Hoisting Engine Co.
8.
9 by 10 inches.
3 inch.
None.
None.
None.
None.
None. | do.
1½ cubic yards.
Lambert Hoisting Engine Co.
8.
9 by 10 inches.
3 inch.
None.
None.
None.
None.
None. | do.
1½ cubic yards.
Lambert Hoisting Engine Co.
8.
9 by 10 inches.
3 inch.
None.
None.
None.
None.
None. |
| 22. Swinging engine:
(a) Make.....
(b) Number of drums.....
(c) Dimensions of cylinders.....
(d) Diameter of rope..... | do.
1½ cubic yards.
Lambert Hoisting Engine Co.
8.
9 by 10 inches.
3 inch.
None.
None.
None.
None. | do.
1½ cubic yards.
Lambert Hoisting Engine Co.
8.
9 by 10 inches.
3 inch.
None.
None.
None.
None. | do.
1½ cubic yards.
Lambert Hoisting Engine Co.
8.
9 by 10 inches.
3 inch.
None.
None.
None.
None. |

| | | | |
|---|----------------------|--|---|
| 23. Boiler: | 8 feet 6 inches..... | 7 feet 1 inch..... | 7 feet 1 inch..... |
| (a) Height..... | 43 inches..... | 3 feet..... | 3 feet..... |
| (b) Diameter..... | 480 square feet..... | 214 square feet..... | 214 square feet..... |
| (c) Heating surface..... | 125 pounds..... | 100 pounds..... | 100 pounds..... |
| (d) Working pressure..... | | | |
| OPERATING COST. | | | |
| 24. Pay roll..... | | (1) \$24.35 | (1) \$24.35 |
| 25. Supplies..... | \$260.16 | (2) (3) | (2) (3) |
| 26. Repairs..... | | | |
| (a) Hull..... | | | |
| (b) Machinery..... | 24.54 | | |
| 27. Miscellaneous..... | | | |
| Total..... | \$276.70 | | \$24.35 |
| 28. Number of men in crew..... | | No regular number..... | No regular number..... |
| 29. Work done during the year and where operated..... | | Maneuvering dam No. 2..... | Maneuvering dam No. 1, tug
Ford. |
| | | Remarks..... | Remarks..... |
| | | Clamshell bucket used to clear
the lock and approaches of
deposit..... | 1 Operated by lockmen.
2 Kept up by lockmen. |
| | | 1 Operated by lockmen. | |

TABLE XIII.—Report of operations of maneuver boats for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name..... | No. 9113. | No. 9122. | No. 9123. | No. 9127. |
|----------------------------------|-----------------------------------|-----------------------------------|------------------------------|---|
| 2. District..... | Vicksburg, Miss. | Vicksburg, Miss. | Vicksburg, Miss. | Vicksburg, Miss. |
| 3. Where built..... | Monroe, La. | 1912. | New Orleans, La. | 1912. |
| 4. When built..... | United States | United States | United States | United States |
| 5. Builder..... | 6 weeks | 1 month. | 30 days. | 1 month. |
| 6. Time to build..... | Wood | Wood | Wood, creosoted | Wood. |
| 7. Material of hull..... | \$2,300 | \$2,336 | \$2,336 | \$2,500. |
| 8. Cost of hull..... | \$1,400 | \$1,400 | \$2,078 | \$1,400. |
| 9. Cost of machinery..... | \$5,700 | \$5,085 | \$5,713 | \$5,900. |
| 10. Total cost..... | 60 feet. | 60 feet. | 60 feet. | 60 feet. |
| 11. Length..... | 25 feet. | 30 feet. | 30 feet. | 25 feet. |
| 12. Beam..... | 4 feet. | 4 feet. | 4 feet. | 4 feet. |
| 13. Depth..... | 1 foot 4 inches | 1 foot 8 inches. | 1 foot. | 1 foot 1 inch. |
| 14. Draft forward..... | 1 foot 9 inches. | 2 feet. | 1 foot 6 inches | 1 foot 9 inches. |
| 15. Draft aft..... | 36 tons. | 75 tons. | 75 tons. | 50 tons. |
| 16. Displacement..... | | | | |
| 17. Mast: | | | | |
| (a) Height..... | 36 feet. | 28 feet 6 inches. | 25 feet. | 20 feet 10 inches. |
| (b) Dimensions..... | 13 by 13 inches. | 14 by 14 inches. | 14 by 14 inches. | 12 by 13 inches. |
| 18. Boom: | | | | |
| (a) Length..... | 46 feet. | 50 feet. | 60 feet. | 40 feet. |
| (b) Dimensions..... | 12 by 12 inches. | 12 by 14 inches. | 12 by 14 inches. | 14 by 16 inches. |
| (c) How braced..... | Not braced. | Not braced. | Belly line. | Dead end of boom; line about 6 feet from end of boom. |
| (d) Capacity in tons..... | 5. | 5. | 5. | 5. |
| 19. Bull-wheel diameter..... | 16 feet. | 16 feet. | 15 feet. | 10 feet 2 inches. |
| 20. Bucket: | | | | |
| (a) Type..... | None. | None. | Clamshell and orange peel. | Clamshell, Hayward make. |
| (b) Capacity..... | | | 4 yard each. | 4 cubic yard. |
| 21. Hoisting engine: | | | | |
| (a) Make..... | Lidgerwood Manufacturing Co. | Lambert. | American Hoist & Derrick Co. | American Hoist & Derrick Co. |
| (b) Number of drums..... | 2. | 2. | 2. | 2. |
| (c) Dimensions of cylinders..... | 8 by 14 inches. | 8 by 10 inches. | 8 by 10 inches. | 7 by 10 inches. |
| (d) Diameter of rope..... | 4 inch. | 4 inch. | 4 inch. | 4 inch. |
| 22. Swinging engine: | | | | |
| (a) Make..... | Hoisting engine used for swinging | Hoisting engine used for swinging | American Hoist & Derrick Co. | Hoisting engine used for swinging |
| (b) Number of drums..... | | | 1. | |
| (c) Dimensions of cylinders..... | | | 4 inches by 5 inches. | |
| (d) Diameter of rope..... | | | 4 inch. | |
| 23. Roller: | | | | |
| (a) Height..... | 7 feet 3 inches. | 8 feet. | 95 inches. | 7 feet 2 inches. |
| (b) Diameter..... | 3 feet. | 3 feet 2 inches. | 42 inches. | 37 inches. |
| (c) Hoisting surface..... | 271 square feet. | 272 square feet. | 263 square feet. | 260 square feet. |
| (d) Working pressure..... | 100 pounds. | 80 pounds. | 126 pounds. | 100 pounds. |

| OPERATING COST. | | | | | |
|---|-----|----------|-----|---------|--|
| 24. Pay roll..... | (1) | \$318.57 | | | |
| 25. Supplies | | | (1) | \$91.70 | \$302.50 |
| 26. Repairs..... | | | | | \$21.00 |
| (a) Hull..... | | | | | \$75.00 [*] |
| (b) Machinery..... | | | | | \$22.72 |
| 27. Miscellaneous..... | | | | | \$49.17 |
| Total..... | | | | | \$1,610.99 |
| 28. Number of man in crew..... | (1) | | | | See Remarks. |
| 29. Work done during the year and where operated..... | (2) | | | | Maneuvered dam No. 6, Ousachita River, Ark.

Remarks:
Operated by lockmen.

Maneuvered dam, 4 days; dredged at toe of dam, 7 days; redistributed heavy riprap at toe of dam, 6 days; filled hole below lock, 4 days; dredged channel from lock to deep water downstream, 34 days. |
| | | | | | \$179.81 |
| | | | | | (1). Maneuvered dam No. 8, Ousachita River, Ark.

Remarks:
Operated by lockmen. |

TABLE XIV.

**TUG AND SURVEY BOATS (SCREW—STEAM
VESSELS ONLY.)**

4389

TABLE XIV.—*Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending Dec. 31, 1917.*

| Name..... | Adams, H. M. | Anger. | Arago. | Aristae. | Boat. |
|--|-------------------------------------|---|---------------------------------------|-----------------------------------|-------------------------------------|
| 1. District..... | Second, Portland, Ore. | Savannah, Ga. | Second, Portland, Ore. | Milwaukee, Wis. | Third, Mississippi River. |
| 2. Where built..... | Astoria, Ore. | Charleston, S. C. | Portland, Ore. | Manitowoc, Wis. | Pittsburgh, Pa. |
| 3. When built..... | 1913. | 1906. | 1904. | 1899. | 1871. |
| 4. Builder..... | Wilson Bros. | Riverside Iron Works | Worke | H. B. Burger. | Not known. |
| 5. Time to build..... | 8 months. | Oct. 1, 1904, to June 28, 1906. | 5 months. | 3 months. | Do. |
| 6. Where purchased..... | | For Engineer Department under contract. | | | New Orleans, La. |
| 7. When purchased..... | | 1906, built for Engineer Department under contract. | | | 1911. |
| 8. From whom purchased..... | | Riverside Iron Works, built for Engineer Department under contract. | | | Blazo Towboat Co. |
| 9. Purchase price..... | | \$10,196, built for Engineer Department under contract. | | | \$10,000. |
| 10. Material of hull..... | Wood. | Wood. | Wood. | Wood. | Iron. |
| 11. Material of house..... | do. | do. | do. | do. | Wood. |
| 12. Contract cost..... | \$16,465.83. | \$12,000. | \$24,460, including outfit. | \$2,325. | Not known. |
| 13. Cost of outfit..... | \$431.75. | \$1,383. | Included in contract cost. | \$875. | Do. |
| 14. Present value..... | \$14,000. | \$5,000. | \$5,000. | \$900. | \$11,000. |
| 15. Hull: | | | | | |
| (a) Length over all..... | 78 feet 4 inches. | 81 feet. | 89 feet 6 inches. | 45 feet 6 inches. | 65 feet. |
| (b) Length on water line..... | 71 feet 4 inches. | 70 feet 9 inches. | 82 feet. | 43 feet 5 inches. | 58 feet. |
| (c) Beam over all..... | 18 feet 9 inches. | 17 feet 2 inches. | 18 feet. | 9 feet. | 16 feet 3 inches. |
| (d) Beam on water line..... | 16 feet 10 inches. | 15 feet 4 inches. | 14 feet. | 8 feet 10 inches. | 15 feet 6 inches. |
| (e) Molded depth amidship..... | 7 feet 6 inches. | 10 feet. | 9 feet. | 4 feet. | 7 feet. |
| (f) Depth of keel outside of hull..... | 5 inches. | 6 inches. | 8 inches. | 3½ inches. | None. |
| (g) Draft forward..... | 5 feet 4 inches. | 4 feet 9 inches. | 6 feet. | 1 foot 8½ inches. | 7 feet. |
| (h) Draft at..... | 7 feet. | 6 feet. | 6 feet 6 inches. | 7 feet. | 7 feet. |
| (i) Displacement (long tons)..... | 96. | 96. | 90. | 8. | 73.5. |
| 16. Engines: | | | | | |
| (a) Number and type of propelling engines..... | 1 fore and aft compound..... | Fore and aft compound, Inc. G. Throp & Sons. | One 2-cylinder fore and aft compound. | 1 single-cylinder, noncondensing. | 1 upright marine, high pressure. |
| (b) Dimensions of cylinders and stroke..... | 11 and 22 inches by 14-inch stroke. | 9 and 18 inches by 12-inch stroke. | 10 and 22 inches by 14-inch stroke. | 7½ inches; stroke, 9 inches. | 18 inches diameter, 20-inch stroke. |

| | 165. | 172. | 250. | 200. | 150. | |
|---|--|-------------------------------|--|-------------------------------------|--------------------------------------|--|
| (c) Revolutions per minute (average). | | | | | | |
| (d) Total horsepower. | 100. | 150. | 140. | 50. | 250. | |
| 17. Propeller: | | | | | | |
| (a) Diameter. | 64 inches. | | 60 inches. | 34 inches. | 6 feet. | |
| (b) Number of blades. | 4. | 4. | 4. | 4. | 4. | |
| (c) Pitch. | 90 inches. | 7 feet. | 78 inches. | 56 inches. | 12 feet. | |
| 18. Boilers: | | | | | | |
| (a) Number and type. | 1 Scotch marine. | 1 Scotch marine. | 1 cylindrical return tubular. | 1 Scotch marine. | 1 Mississippi River return flue. | |
| (b) Dimensions. | 7 feet 6 inches diameter by 10 feet long. | 6 feet diameter, 8 feet long. | 8 feet diameter by 9 feet 4 inches long. | 54 inches diameter, 72 inches long. | 60 inches by 16 feet. | |
| (c) Number and diameter of tubes in one boiler. | 98 of 3 inches diameter. | 88; 8 inches in diameter. | 178 of 2 1/2 inches diameter. | 46; 2 1/2 inches outside diameter. | 15, 7 inches. | |
| (d) Heating surface. | 750 square feet. | 417 square feet. | 820 square feet. | 75 square feet. | 440 square feet. | |
| (e) Grate surface. | 1 furnace, 45 inches diameter by 7 feet 9 inches long. | 18 square feet. | 22 square feet. | 9 square feet. | 22 square feet. | |
| (f) Steam pressure. | 165 pounds. | 150 pounds. | 125 pounds. | 200 pounds. | 150 pounds. | |
| 19. Speed in miles per hour. | 10. | 10. | 11. | 11. | 10. | |
| 20. Towing capacity. | 800 tons. | Good. | 600 tons. | Unknown. | 500 tons up; 1,000 tons down stream. | |
| OPERATING COST. | | | | | | |
| 21. Pay roll. | \$183,448.80 | \$4,000.33 | \$5,000.18 | \$327.50 | \$2,025.45 | |
| 22. Supplies: | | | | | | |
| (a) Subsistence. | (1) | 2,265.06 | 1,027.99 | | 413.62 | |
| (b) Engine room. | (1) | 254.06 | 60.77 | 1.80 | 9.17 | |
| (c) Boiler room. | (1) | | 18.53 | | | |
| (d) Miscellaneous. | | 48.04 | 180.67 | 1.20 | 6.00 | |
| 23. Coal. | \$1,404.54 | 928.13 | 1,840.12 | 90.86 | 1,161.08 | |
| 24. Oil: | | | | | | |
| (a) Kerosene. | (1) | 15.25 | 22.47 | | 4.25 | |
| (b) Lubricating. | (1) | 44.08 | 20.65 | | 36.68 | |
| 25. Water. | (1) | 34.00 | | | | |
| 26. Ordinary repairs: | | | | | | |
| (a) Hull. | | 312.23 | 12.23 | 61.62 | 92.29 | |
| (b) Machinery. | | 212.10 | 5.96 | 8.64 | 339.45 | |
| 27. Extraordinary repairs: | | | | | | |
| (a) Hull. | | 661.15 | 330.51 | | | |
| (b) Machinery. | | 84.79 | 336.15 | | | |
| 28. Alterations and additions. | | | | | | |
| (a) Hull. | | 150.00 | 54.84 | | | |
| (b) Machinery. | | | | | | |
| 29. Laundry, ice, and miscellaneous expenses. | | 138.71 | 182.27 | | 28.00 | |
| 30. Office expenses. | (1) | 775.85 | 108.70 | 24.58 | | |
| 31. Total. | \$85,787.31 | \$11,355.71 | \$10,977.93 | \$516.10 | \$4,715.99 | |

TABLE XIV.—Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Adams, H. M. | Angler. | Arago. | Ariadne. | Boat. |
|--|--|--|---|---|--|
| OPERATING COST—contd. | | | | | |
| 32. Cost of coal per ton..... | Fuel oil, per barrel, \$0.75 and \$1.10. | \$5.121..... | \$8..... | \$443 (short)..... | \$2.90. |
| 33. Cost of oil per gallon..... | Lubricating, \$0.37..... | ..... | Illuminating, \$0.192; lubricating, \$0.37..... | ..... | \$0.30 to \$0.60. |
| 34. By whom were repairs made. | Helser & Uden Machine Works, Portland, Ore. | John Bourke & Sons..... | Albina Engine & Machine Works and Oregon Dry Dock, Portland, Ore. | United States..... | United States fleet at Vicksburg. |
| 35. Number of days under steam..... | 316..... | 123..... | 348..... | 90..... | 273. |
| 36. Remarks on work done by tug during year. | Tender for pipe-line dredge Multnomah.

<i>Remarks.</i>
Operated on Columbia and lower Willamette Rivers below Portland, Ore.; indicated in operating cost of pipe-line dredge Multnomah.
• Fuel oil.
• Oil burner. | See remarks.....

<i>Remarks.</i>
Used in district as inspection boat, also for towing plants to various parts of district. | (1).....

<i>Remarks.</i>
Operated at mouth of Columbia River, Oregon and Washington; towing and transporting freight and in making surveys and inspections. | See remarks.....

<i>Remarks.</i>
Towing, transporting materials and supplies at Milwaukee, Wis. | (1).....

<i>Remarks.</i>
Engaged as tender to works at Panther Creek, Bolivar, Minn. and as harbor tug at Vicksburg. |

| Name..... | Brewerton. | Camden. | Carey, Thomas Lincoln. | Castle. | Carew, Richard. |
|--|------------------------------------|---|---|--|---|
| 1. District..... | Buffalo, N. Y. | Philadelphia, Pa. | Buffalo, N. Y. | Washington, D. C. | Wilmington, N. C. |
| 2. Where built..... | Benton Harbor, Mich. | do. | Toledo, Ohio. | Baltimore, Md. | Baltimore, Md. |
| 3. When built..... | 1893 | 1906 | 1898 | 1897 | 1900 |
| 4. Builder..... | Not known. | Neale & Levy Ship & Engine Building Co. | Craig Shipbuilding Co. | Spedden Ship Building Co. | Columbia Iron Works & Dry-dock Co. |
| 5. Time to build..... | do. | New York | 6 months. | Unknown. | 1 year. |
| 6. Where purchased..... | Bay City, Mich. | do. | Toledo, Ohio. | Baltimore, Md. | Baltimore, Md. |
| 7. When purchased..... | April, 1906 | 1912 | 1898 | 1897 | 1900 |
| 8. From whom purchased..... | Central Dredging Co. | Morgan Towing Co. | Craig Shipbuilding Co. | Transferred from New London, Conn., district, Oct. 11, 1911. | Columbia Iron Works & Dry-dock Co. |
| 9. Purchase price..... | \$2,960. | \$30,000. | \$11,970. | \$24,973.33. | \$26,500. |
| 10. Material of hull..... | Wood. | Steel. | Steel. | Steel. | Steel. |
| 11. Material of house..... | do. | do. | do. | Wood. | Do. |
| 12. Contract cost..... | \$2,960. | do. | \$11,970. | No contract. | \$26,500. |
| 13. Cost of outfit..... | do. | do. | \$1,000. | Unknown. | \$1,500. |
| 14. Present value..... | \$7,000. | \$21,000. | \$7,000. | \$20,000. | \$15,500. |
| 15. Hull: | | | | | |
| (a) Length over all..... | 65 feet 8½ inches. | 80 feet. | 70 feet. | 95 feet. | 84 feet 9 inches. |
| (b) Length on water line..... | 62 feet ½ inch. | 74 feet. | 60 feet. | 82 feet 4 inches. | 80 feet. |
| (c) Beam over all..... | 15 feet 11 inches. | 20 feet. | 16 feet. | 20 feet 2 inches. | 18 feet 6 inches. |
| (d) Beam on water line..... | 14 feet 5 inches. | 20 feet. | 14 feet 8 inches. | 19 feet. | 17 feet 6 inches. |
| (e) Molded depth amidship..... | 8 feet 11 inches. | 9 feet. | 8 feet. | 10 feet 6 inches. | 9 feet 4 inches. |
| (f) Depth of keel outside of hull..... | 5 feet. | 6 inches. | 8 inches. | 6½ inches. | 6 inches. |
| (g) Draught forward..... | 9 feet 4 inches. | 7 feet. | 5 feet. | 6 feet 7½ inches. | 6 feet. |
| (h) Draught aft..... | 60. | 170. | 6 feet 6 inches. | 9 feet. | 8 feet 5 inches. |
| (i) Displacement (long tons). | 60. | 170. | 90. | 165.3. | 200. |
| 16. Engines: | | | | | |
| (a) Number and type of propelling engines..... | 1 noncondensing, upright inverted. | 1 compound. | 1 compound condensing. | 1 forward and aft compound condensing. | 1 fore and aft compound. |
| (b) Dimensions of cylinders and stroke..... | 16-inch diameter, 18-inch stroke. | 12½ and 26 by 18 inches. | 12 by 22 inch diameter, 16-inch stroke. | 12 by 22½ inches by 22-inch stroke. | Diameter 14 by 28 inches by 22-inch stroke. |
| (c) Revolutions per minute (average). | 100. | 128. | 100. | 135. | 127. |
| (d) Total horsepower..... | 175. | 175. | 100. | 225. | 280. |
| 17. Propeller: | | | | | |
| (a) Diameter..... | 5 feet 6 inches. | 8 feet. | 5 feet 6 inches. | 6 feet 10 inches. | 7 feet. |
| (b) Number of blades..... | 4. | 4. | 4. | 4. | 4. |
| (c) Pitch..... | Not known. | 8 feet 6 inches. | 7 feet. | 8 feet 7 inches. | Expanded from 10 to 12 feet. |

TABLE XIV.—Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Breverton. | Camden. | Cassey, Thomas Lincoln. | Cudd. | Carswell, Richard. |
|---|---|---|---------------------------------|--|--|
| 18. Boilers:
(a) Number and type..... | 1 marine fire box..... | 1 Scotch tubular..... | 1 Roberts water tube..... | 1 Scotch marine..... | 1 Scotch marine. |
| (b) Dimensions..... | 6 by 10 feet 10 inches..... | 10 feet 9 inches long, 10 feet 7 inches diameter..... | 8 feet 1 inch by 8 feet..... | Length, 10 feet; diameter, 9 feet..... | 10 feet 9 inches; diameter, 10 feet 6 inches long. |
| (c) Number and diameter of tubes in one boiler..... | 101, 3 inches diameter, 8 feet 5 inches long..... | 174, 3 inches..... | ..... | 98 tubes of 3½ inches diameter, 7 feet long..... | 152 of 3 inches diameter. |
| (d) Heating surface..... | 860 square feet..... | 1,200 square feet..... | 1,200 square feet..... | 752.32 square feet..... | 1,102 square feet. |
| (e) Grate surface..... | 28 square feet..... | 43.5 square feet..... | 43 square feet..... | 36 square feet..... | 36.27 square feet. |
| (f) Steam pressure..... | 150 pounds..... | 150 pounds..... | 160 pounds per square inch..... | 110 pounds..... | 110 pounds. |
| 19. Speed in miles per hour..... | 10..... | 12..... | 11..... | 14..... | 10 miles. |
| 20. Towing capacity..... | One 230 cubic yards dump snow loaded, 5 miles per hour..... | 350 tons..... | 200 tons..... | No test has been made..... | 500 cubic yards mud scows loaded. |
| OPERATING COST. | | | | | |
| 21. Pay roll..... | \$2,454.98 | \$5,007.72 | \$3,163.66 | \$5,767.17 | \$710.66 |
| 22. Supplies:
(a) Subistence..... | 450.83 | 1,947.71 | | 1,406.06 | 198.03 |
| (b) Engine room..... | 45.88 | 43.49 | 26.58 | 101.87 | ..... |
| (c) Boiler room..... | 79.85 | 86.07 | 3.45 | 85.55 | ..... |
| (d) Miscellaneous..... | 66.84 | 332.43 | 47.18 | 292.68 | 36.95 |
| 23. Coal..... | 1,049.76 | 907.79 | 1,478.65 | 1,454.79 | 309.00 |
| 24. Oil:
(a) Kerosene..... | 5.61 | 7.11 | 7.70 | 11.85 | |
| (b) Lubricating..... | 45.77 | 22.80 | 25.64 | 2.81 | ..... |
| 25. Water..... | ..... | ..... | ..... | 16.40 | ..... |
| 26. Ordinary repairs:
(a) Hull..... | 766.07 | 102.72 | 579.10 | 48.49 | 124.72 |
| (b) Machinery..... | 685.97 | 75.63 | 960.80 | 232.45 | 137.95 |
| 27. Extraordinary repairs:
(a) Hull..... | | 40.10 | | | |
| (b) Machinery..... | ..... | 331.62 | ..... | ..... | ..... |
| 28. Alterations and additions:
(a) Hull..... | | | | | |
| (b) Machinery..... | ..... | ..... | ..... | ..... | ..... |
| 29. Laundry, ice, and miscellaneous expenses..... | 9.80 | 64.84 | 30.24 | 101.56 | ..... |
| 30. Office expenses..... | 360.00 | 1,303.12 | ..... | 900.00 | ..... |
| 31. Total..... | \$4,908.55 | \$10,315.66 | \$6,014.00 | \$10,517.66 | \$1,527.32 |

| | | | | | | | |
|--|--|---|---|--|---|-------|---------------------------------------|
| 32. Cost of coal per ton..... | \$3.403. | ..... | \$6.25 to \$6.55 | ..... | \$3.50 to \$7.65 | ..... | \$3.20. |
| 33. Cost of oil per gallon.... | Kerosene, \$0.11; engine, \$0.49; cylinder, \$0.65. | ..... | \$0.38. | ..... | \$0.15 to \$0.60 | ..... |  |
| 34. By whom were repairs made. | United States Davis Dry Dock Co., St. Lawrence Marine Railway Co. | ..... | Crew..... | ..... | Federal Electric Welding Co., Baltimore, Md. | ..... | Repairs made by crew and local shops. |
| 35. Number of days under steam. | 232. | ..... | 245. | ..... | 325. | ..... | 33 days. |
| 36. Remarks on work done by tug during year. | Dredge tender, etc..... | ..... | See below. | ..... | ..... | ..... | Towing scows. |
| | <i>Remarks.</i>
Charlotte, Great Sodus, Little Sodus, and Oswego, where she was employed as tender for dredge and for general towing. | <i>Remarks.</i>
In Delaware River, above and below Philadelphia, Pa. | <i>Remarks.</i>
In Buffalo and Black Rock Harbors and Niagara River, N. Y., as inspection and patrol boat. | <i>Remarks.</i>
Tug was employed in miscellaneous towing, inspection, survey work, and fish stake inspection on Chesapeake Bay and tributaries. | <i>Remarks.</i>
This tug was operated as tender to the dredge Hercules on Cape Fear River below Wilmington, N. C.
This tug is permanently out of commission until such time as a new boiler is purchased and installed. | | |

TABLE XIV.—*Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Cerberus. | Chalcasus. | Chippewa. | Cycle. | Opqd. |
|--|--------------------------|-----------------------------------|--|---|---|
| 1. District..... | New York. | Mobile, Ala. | Norfolk, Va. | Duluth, Minn. | Wilmington, N. C. |
| 2. Where built..... | Camden, N. J. | Pensacola, Fla. | Jamestown, R. I. | Buffalo, N. Y. | Hull, Madison, Md.; machinery, Baltimore, Md. |
| 3. When built..... | 1905. | United States navy yard. | 1903. | 1885. | 1906. |
| 4. Builder..... | John H. Dialogue & Son. | | Not known. | No record. | Hull, unknown; machinery, E. J. Codd Co. |
| 5. Time to build..... | 12 months. | 12 months. | do. | do. | Unknown. |
| 6. Where purchased..... | | | Boston, Mass. | Duluth, Minn. | Baltimore, Md. |
| 7. When purchased..... | | | 1906. | 1903. | 1907. |
| 8. From whom purchased..... | | | Submarine Signal Co. | Mitchell & McClure Lumber Co. | Vivian Phillips. |
| 9. Purchase price..... | | | \$5,500. | \$4,110. | \$5,000. |
| 10. Material of hull..... | Steel. | Steel. | do. | W ood. | W ood. |
| 11. Material of house..... | Wood. | White pine. | do. | do. | Do. |
| 12. Contract cost..... | \$43,740. | \$27,500 cost of construction. | Not known. | Included in purchase price. | Purchased. |
| 13. Cost of outfit..... | | Transferred from U. S. S. Rosell. | Included in purchase price. | | Included in purchase price. |
| 14. Present value..... | \$25,000. | \$18,000. | \$2,500. | \$1,700. | \$4,000. |
| 15. Hull: | | | | | |
| (a) Length over all..... | 109 feet 3 inches. | 109 feet. | 70 feet 8 inches. | 53 feet 6 inches. | 58 feet. |
| (b) Length on water line..... | 102 feet. | 99 feet 6 inches. | 68 feet 7 inches. | 45 feet 3 inches. | 56 feet 6 inches. |
| (c) Beam over all..... | 23 feet. | 20 feet. | 14 feet 10 inches. | 14 feet 3 inches. | 18 feet 6 inches. |
| (d) Beam on water line..... | 21 feet 2 inches. | 18 feet 3.5 inches. | 13 feet 7 inches. | 13 feet 3 inches. | 18 feet 6 inches. |
| (e) Molded depth amidship..... | 12 feet 6 inches. | 9 feet 9 inches. | 8 feet 4 inches. | 6 feet 6 inches. | 7 feet. |
| (f) Depth of keel outside of hull..... | 5 inches. | 6 inches. | | | Unknown. |
| (g) Draught forward..... | 7 feet 9 inches. | 7 feet. | 4 feet 6 inches. | 3 feet. | 5 feet 10 inches. |
| (h) Draught aft..... | 11 feet. | 8 feet 3 inches. | 6 feet 6 inches. | 7 feet 3 inches. | 8 feet. |
| (i) Displacement (long tons). | 226. | 155. | 45. | About 33 tons. | 100. |
| 16. Engines: | | | | | |
| (a) Number and type of propelling engines..... | 1 fore and aft compound. | 2 compound, condensing. | 1 single-acting compound. | 1 high pressure single cylinder. | 1 steple compound. |
| (b) Dimensions of cylinders and stroke..... | 16 by 32 by 24 inches. | 12 and 20 inches by 12 inches. | High, 10 by 12 inches; low, 10 by 12 inches. | Diameter of cylinder, 12 1/2 inches; stroke, 12 inches. | 9 inches, and 18 by 16 inch stroke. |
| (c) Revolutions per minute (average)..... | 110. | 165. | 160. | 140. | 132. |
| (d) Total horsepower..... | 340. | 220. | | 133. | 90, approximately. |

| | | | | | |
|--|--|---|---|---|---|
| 17. Propeller:
(a) Diameter.....
(b) Number of blades..... | 7 feet 6 inches.
4..... | 5 feet 5 inches.
4..... | 60 inches.
4..... | 5 feet 4 inches.
4..... | 5 feet 4 inches.
4..... |
| 18. Boilers:
(a) Pitch.....
(b) Number and type.....
(c) Dimensions.....
(d) Number and diameter of tubes in one boiler.....
(e) Heating surface..... | 10 feet 6 inches.
1 Roberts water tube.
9 by 10 feet outside.
60, 14, 2, and 3 inch diameter.
1,800 square feet. | 7 feet.
1 Scotch marine.
10 by 10 feet.
88 of 4-inch diameter.
884 square feet. | Not known.
1 Army water tube.
Width, 72 inches; height, 91 inches; length, 72 inches.
844 square feet. | 1 return tube marine.
4 by 9 feet.
56, 24 inches by 7 feet; 2, 14 by 30 inches.
375 square feet. | 7 feet.
1 marine leg.
6 feet diameter, 10 feet long.
669 square feet, approximately.
21 square feet.
125 pounds.
84.
200 to 500 cubic yards, scows loaded. |
| 19. Speed in miles per hour.....
20. Towing capacity..... | 63 feet 3 inches.
140 pounds.
10.
4 miles per hour towing dredge Wabalak. | 26.7 square feet.
125 pounds.
10.
100-ton barge, 5 miles per hour. | 26.7 square feet.
125 pounds.
10.
100-ton barge, 5 miles per hour. | 17 square feet.
110 pounds.
94.
Sufficient to handle scows. | 21 square feet.
125 pounds.
84.
200 to 500 cubic yards, scows loaded. |
| OPERATING COST. | | | | | |
| 21. Pay roll..... | \$7,963.83 | \$6,985.50 | \$2,025.00 | \$2,081.50 | \$4,240.51 |
| 22. Supplies:
(a) Subsistence.....
(b) Engine room.....
(c) Boiler room.....
(d) Miscellaneous..... | 1,613.70
546.74
277.17
3,725.13 | 1,860.48
103.66
6.26
277.17
51.87 | 171.18
31.24
170.65 | 16.71
6.35
17.94
685.62 | 1,122.33
107.66
107.68
936.13 |
| 23. Coal..... | | | | | |
| 24. Oil:
(a) Kerosene.....
(b) Lubricating..... | 174.93
96.00 | 5.04
12.68 | | 14.60 | 14.17
20.54 |
| 25. Water..... | | | | | |
| 26. Ordinary repairs:
(a) Hull.....
(b) Machinery..... | 978.80 | 214.39
27.19 | 24.91
19.00 | 47.10
44.68 | 207.02
86.40 |
| 27. Extraordinary repairs:
(a) Hull.....
(b) Machinery..... | 2,062.33
1,876.73 | 2,062.33
1,876.73 | | 226.39
58.75 | 884.60
992.19 |
| 28. Alterations and additions:
(a) Hull.....
(b) Machinery..... | 1,580.30 | 1,580.30 | | 19.50
28.00
32.75 | 87.44
61.23 |
| 29. Laundry, ice, and miscellaneous expenses..... | 343.31 | 343.31 | 2.50
66.43 | 32.75 | |
| 30. Office expenses..... | | | 15.00 | 323.79 | |
| 31. Total..... | \$15,004.13 | \$13,880.20 | \$3,125.91 | \$3,561.75 | \$8,573.90 |
| 32. Cost of coal per ton..... | \$4.25 average | \$1.83 to \$2.19 | \$9.48 | \$2.35 and \$3.65 | \$4.10. |
| 33. Cost of oil per gallon..... | | No oil used as fuel. | | \$0.24 to \$0.50. | \$0.36. |

TABLE XIV.—Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending Dec 31, 1916—Continued.

| Name..... | Cerberus. | Chickasaw. | Chipeta. | Circle. | Coyote. |
|--|--|---|--|---|---|
| 34. By whom were repairs made. | Navy yard, New York..... | (1) | | United States..... | Wilmington Iron Works and Machine Shop, Lock No. 2. 297. |
| 35. Number of days under steam. | 282 (days of 24 hours)..... | 109 | 366..... | 245..... | |
| 36. Remarks on work done by tug during year. | Patrol duty.....

<i>Remarks.</i>
Patrol duty New York Bay and Harbor, and seaward 5 miles outside Scotland Lighthouse. | (1).....

<i>Remarks.</i>
The total operating cost includes \$1,887.80 for storm damage due to hurricane of July 5, 1916.
Henderson Iron Works; Home Industry Iron Works; Gulf City Boiler Works, Mobile, Miss.; C. Gatti Pascagoula, Miss.; A. B. Farmer, Moss Point, Miss.; U. S. shipyard, Pascagoula, Miss. Survey work in Mobile Harbor and Bar and harbors and channels along the Mississippi coast and at times to assist dredges and to make inspections of various improvements. | Inspections and surveys.....

<i>Remarks.</i>
Improvement of James and Appomattox Rivers, Va. | Inspection and surveys on Keweenaw. 1

<i>Remarks.</i>
Keweenaw waterway, Minn. Waterway: Towing plant on construction mooring and repairs to revellements and breakwaters, Keweenaw waterway. | Waiting on dredge Ajax on river shoals, Cape Fear River N. C., above Wilmington, and miscellaneous towing, Lock No. 2, Cape Fear River, N. C. |

| Name | Cyn. etc. | Deartborn. | Donovan, C. | Engineer. | Essays. |
|---|---|-----------------------------------|--|---|--------------------------------------|
| 1. District. | Wilmington, N. C. | Chicago, Ill. | New Orleans, La. | Manilla, P. I. | Duluth, Minn. |
| 2. Where built. | Baltimore, Md. | Racine, Wis. | Newport News, Va. | Hongkong, China. | Muskegon, Mich. |
| 3. When built. | 1891 | 1902 | 1895 | 1907 | 1908 |
| 4. Builder. | Thos. McCauley, hull; J. Clark & Co. machinery. | The Racine Boat Co. | Newport News Shipbuilding Co. | Hongkong & Whampoa Dock Co. | Racine Boat Manufacturing Co. |
| 5. Time to build. | Unknown | Not known | Unknown | 4 months | 9 months |
| 6. Where purchased. | Harleston | Racine, Wis. | Punta Gorda, Fla. | | |
| 7. When purchased. | 1897 | 1902 | 1906 | | |
| 8. From whom purchased. | Ords & Bochman | The Racine Boat Co. | Albert Dewey | | |
| 9. Purchase price. | \$8,600 | \$5,000 | \$29,000 | | |
| 10. Material of hull. | Wood | Steel | Steel | Steel | Steel |
| 11. Material of house. | do. | Wood | Wood | Wood | Do. |
| 12. Contract cost. | Purchase | \$5,000 | | \$41,896.87 | \$35,950. |
| 13. Cost of outfit. | Included in purchase price | | | \$21,914.60 | Boat furnished complete. |
| 14. Present value. | \$10,000 | \$2,500 | \$26,000 | \$27,500 | \$33,793. |
| 15. Hull: | | | | | |
| (a) Length over all. | 74 feet 7 inches | 50 feet | 95 feet | 111 feet 6 inches | 85 feet. |
| (b) Length on water line. | 71 feet | 47 feet 3 inches | 87 feet | 106 feet | 74 feet 6 inches. |
| (c) Beam over all. | 18 feet 6 inches | 8 feet 9 inches | 20 feet 10 inches | 22 feet | 21 feet. |
| (d) Beam on water line. | 17 feet 10 inches | 8 feet 6 inches | 19 feet 2 inches | 20 feet | 20 feet. |
| (e) Molded depth amidship. | 7 feet 10 inches | 4 feet 9 inches | 10 feet | 11 feet | 11 feet 6 inches. |
| (f) Depth of keel outside of hull. | 6 inches | 4 inches | 4 inches | 6 1/2 inches | 4 inches. |
| (g) Draft forward. | 5 feet 6 inches | 1 foot 2 inches | 7 feet | 9 feet | 6 feet. |
| (h) Draft aft. | 8 feet 4 inches | 3 feet 10 inches | 9 feet | 10 feet 6 inches | 10 feet 6 inches. |
| (i) Displacement (long tons). | 136 | 9 | 180 | 298.8 | 169. |
| 16. Engines: | | | | | |
| (a) Number and type of propelling engine. | 1 steuple compound | 1 fore-and-aft compound | 1 triple expansion surface condensing. | 2 vertical, triple expansion, surface condensing. | 1 compound. |
| (b) Dimensions of cylinders and stroke. | 10 and 20 inches by 20-inch stroke. | 41 by 9 inches; stroke, 6 inches. | 11, 17, and 20 inches by 20-inch stroke. | 9 by 14 by 25 inches; 15-inch stroke. | 16 by 26 inches and 34 by 26 inches. |
| (c) Revolutions per minute (average). | 126 | 300 with 200 pounds steam | 127 | 150 | 110. |
| (d) Total horsepower. | 140 | Rated 33 | 296 | 509 | 500. |
| 17. Propeller: | | | | | |
| (a) Diameter. | 6 feet | 23 inches | 7 feet 4 1/2 inches | Two 6 feet 6 inches. | 8 feet. |
| (b) Number of blades. | 4 | 4 | 4 | 4 | 4. |
| (c) Pitch. | 8 feet. | 47 inches | 11 feet 7 inches | 8 feet 9 inches | |

TABLE XIV.—Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Cynthia. | Dearborn. | Donovan, C. | Engineer. | Esayona. |
|---|---|--|---|---|--|
| 18. Boilers:
(a) Number and type..... | 1 Scotch marine..... | 1 Taylor water-tube boiler..... | 1 Scotch marine return tubular..... | 1 horizontal, return tubular..... | 1 fire-box marine. |
| (b) Dimensions..... | Diameter, 7 feet 6 inches;
length, 10 feet 6 inches..... | 40½ inches long, 33½ inches
wide..... | 11 feet long by 10½ feet diam-
eter..... | 11 feet diameter, 10 feet long..... | 8 feet 6 inches diameter, 14
feet long..... |
| (c) Number and di-
ameter of tubes
in one boiler..... | 93 tubes 3 inches diameter, 2
tubes 6 inches diameter..... | 240 tubes 1½ inches diameter..... | 128 tubes 3 inches diameter
and 42 stay tubes ½ inch
thick..... | 142 common, 40 stay, all 3
inches external diameter..... | 104; 3½ inches diameter. |
| (d) Heating surface..... | 746 square feet..... | 260 square feet..... | 1,250 square feet..... | 1,600 square feet..... | 956 square feet. |
| (e) Grate surface..... | 22 square feet..... | 94 square feet..... | 38.5 square feet..... | 36 square feet..... | 50 square feet. |
| (f) Steam pressure..... | 126 pounds..... | 210 pounds..... | 160 pounds..... | 180 pounds..... | 176 pounds. |
| 19. Speed in miles per hour..... | 10..... | About 10..... | 11..... | 12..... | 12..... |
| 20. Towing capacity..... | 300 to 500 yards scows loaded. | Not suitable for towing..... | 700 tons..... | 600 tons at 8 knots..... | Ample for large scows or
dredge. |
| OPERATING COST. | | | | | |
| 21. Pay roll..... | \$352.83 | \$1,506.00 | \$5,348.91 | \$8,201.96 | \$2,092.50 |
| 22. Supplies:
(a) Fuel..... | 160.85 | | 1,431.42 | 2,215.19 | 513.38 |
| (b) Subsistence..... | 22.00 | ..... | 661.92 | 273.94 | 19.32 |
| (c) Engine room..... | ..... | ..... | 174.69 | 174.80 | 10.46 |
| (d) Boiler room..... | 7.52 | 28.00 | 992.83 | 875.01 | 367.40 |
| (e) Miscellaneous..... | 424.00 | 333.41 | 2,840.88 | 4,129.40 | 1,694.29 |
| 23. Coal..... | ..... | ..... | ..... | ..... | ..... |
| 24. Oil:
(a) Kerosene..... | | 3.50 | 21.37 | 32.42 | |
| (b) Lubricating..... | 9.00 | 25.40 | 136.04 | 302.31 | 11.86 |
| 25. Water..... | ..... | ..... | ..... | ..... | ..... |
| 26. Ordinary repairs:
(a) Hull..... | 290.15 | | 150.99 | 1,907.98 | 17.08 |
| (b) Machinery..... | 514.33 | 63.45 | 491.77 | 1,742.80 | 185.06 |
| 27. Extraordinary repairs:
(a) Hull..... | | | | | |
| (b) Machinery..... | ..... | ..... | ..... | ..... | 11.60 |
| 28. Alterations and addi-
tions:
(a) Hull..... | | | | | 177.92 |
| (b) Machinery..... | ..... | ..... | ..... | ..... | ..... |
| 29. Laundry, ice and mis-
cellaneous expenses..... | 4.00 | | 87.96 | | 28.99 |
| 30. Office expenses..... | ..... | ..... | 59.00 | ..... | 404.53 |
| 31. Total..... | \$1,793.68 | \$2,040.76 | \$12,319.65 | \$19,946.00 | \$9,105.79 |

TABLE XIV.—*Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Gem. | Gibbons. | Glumore, General. | Overholten. | Hancock. |
|--|---------------------------------------|---|---------------------------------|---------------------------------------|--|
| 1. District..... | Savannah, Ga..... | Savannah, Ga..... | Grand Rapids, Mich..... | Buffalo, N. Y..... | Grand Rapids, Mich..... |
| 2. Where built..... | do..... | Tompkins Cove, N. Y..... | Grand Haven, Mich..... | Erie, Pa..... | Saugatuck, Mich..... |
| 3. When built..... | 1911-12..... | 1897..... | 1906..... | 1920..... | 1900..... |
| 4. Builder..... | U. S. Engineer Department..... | Roderman..... | United States..... | Thomas A. Walton..... | Roger & Bird..... |
| 5. Time to build..... | 34 months..... | Unknown..... | 44 months..... | 6 months..... | Not known..... |
| 6. Where purchased..... | do..... | do..... | Chicago, Ill..... | Erie, Pa..... | Saugatuck, Mich..... |
| 7. When purchased..... | do..... | do..... | 1839..... | 1920..... | 1890..... |
| 8. From whom purchased..... | do..... | do..... | do..... | Thomas A. Walton..... | Roger & Bird..... |
| 9. Purchase price..... | Wood..... | Wood..... | \$7,500..... | \$1,820..... | \$10,000..... |
| 10. Material of hull..... | do..... | do..... | Wood..... | Wood..... | Wood..... |
| 11. Material of house..... | Unknown..... | Unknown..... | do..... | None..... | Do..... |
| 12. Contract cost..... | \$100..... | \$890..... | \$5,452.00..... | \$1,870..... | \$10,000..... |
| 13. Cost of outfit..... | \$3,000..... | \$0..... | \$1,400..... | \$1,000..... | \$12,000..... |
| 14. Present value..... | 45 feet 2 inches..... | 73 feet 6 inches..... | 61 feet 6 inches..... | 31 feet 7 inches..... | 97 feet 10 inches..... |
| 15. Hull: | (a) Length over all..... | 88 feet..... | 57 feet..... | 28 feet..... | 83 feet..... |
| (b) Length on water line..... | 20 feet 4 inches..... | 19 feet..... | 15 feet..... | 8 feet..... | 17 feet 6 inches..... |
| (c) Beam over all..... | 9 feet 3 inches..... | 19 feet..... | 12 feet 10 inches..... | 7 feet 2 inches..... | 16 feet..... |
| (d) Beam on water line..... | 8 feet 9 inches..... | 9 feet..... | 4 feet 10 inches..... | 4 feet 6 inches..... | 7 feet 6 inches..... |
| (e) Molded depth amidship..... | 3 inches..... | 6 inches..... | 5 inches..... | 4 inches..... | 5 feet 6 inches..... |
| (f) Depth of keel outside of hull..... | 2 feet 3 inches..... | 5 feet 6 inches..... | 2 feet 9 inches..... | 6 inches..... | 7 feet 10 inches..... |
| (g) Draft forward..... | 3 feet..... | 9 feet..... | 3 feet 9 inches..... | 3 feet..... | 120..... |
| (h) Draft aft..... | 10.9..... | 124..... | 47..... | 8..... | |
| (i) Displacement (long tons)..... | | | | | |
| 16. Engines: | 1 fore-and-aft compound..... | 1 steaple compound..... | 2 steam, simple condensing..... | 1 single cylinder, noncondensing..... | Fore-and-aft compound, condensing..... |
| (a) Number and type of propelling engines..... | 15 and 9 inches by 7-inch stroke..... | 11 and 22 inches by 16-inch stroke..... | 8 by 10 inches..... | 64 by 64 inches, 6-inch stroke..... | 12 and 20 by 21 inches..... |
| (b) Dimensions of cylinders and stroke..... | 266..... | 118..... | 180..... | 265..... | 116..... |
| (c) Revolutions per minute (average)..... | 24..... | 130..... | 90..... | 12..... | 650..... |
| (d) Total horsepower..... | 23 inches..... | 5 feet 8 inches..... | 35 inches..... | 3 feet..... | |
| 17. Propeller: | (a) Diameter..... | 4..... | 4..... | 3 feet..... | |
| (b) Number of blades..... | 48 inches..... | 5 feet..... | 4..... | 3 feet..... | |
| (c) Pitch..... | | | | 4 feet..... | |

| 18. Boilers: | 1 submerged tube vertical...
40 inches diameter, 63 inches
long. | 1 tubular leg, 2 furnaces...
12 feet long, 6 feet 8 inches
leg. | 1 marine fire box...
9 by 5 feet 3 inches | 1 Roberts water tube...
3 by 4 feet. | 1 marine fire-box boiler...
6 feet 6 inches in diameter by
10 feet in length.
76 tubes of 3-inch diameter. |
|--|--|---|--|--|---|
| (a) Number and type | 188, 1½-inch tube | 822 square feet.
39 square feet.
126 pounds
9 | 435 square feet.
25 square feet.
126 pounds
7 light. | 153 square feet.
7.1 square feet.
100 pounds
8. | 640 square feet.
25.9 square feet.
150 pounds.
10. |
| (b) Dimensions | 10.2 with tide, 8.34 against
tide. | Good. | | 50 tons. | |
| (c) Number and
diameter of
tubes in one
boiler. | | | | | |
| (d) Heating surface. | | | | | |
| (e) Grate surface. | | | | | |
| (f) Steam pressure. | | | | | |
| 19. Speed in miles per hour | | | | | |
| 20. Towing capacity. | | | | | |
| OPERATING COST. | | | | | |
| 21. Pay roll. | \$2,375.00 | \$6,033.67 | \$321.56 | \$328.50 | \$4,438.01 |
| 22. Supplies: | | | | | |
| (a) Substistence. | 1 638.71 | 1,637.40 | | | 1,057.60 |
| (b) Engine room. | 29.66 | 183.85 | | | 48.41 |
| (c) Boiler room. | | | | | 3.25 |
| (d) Miscellaneous. | 827.07 | 827.23 | | 43.72 | 352.91 |
| 23. Coal. | 301.08 | 774.66 | 244.04 | 66.40 | 909.04 |
| 24. Oil: | | | | | |
| (a) Kerosene | 2.40 | 2.10 | | 1.20 | 8.37 |
| (b) Lubricating. | | 21.90 | 2.00 | 7.50 | 83.64 |
| 25. Water. | | 235.25 | | | |
| 26. Ordinary repairs: | | | | | |
| (a) Hull. | 29.45 | 14.87 | 78.90 | 8.64 | |
| (b) Machinery. | 24.65 | 126.61 | 66.63 | 71.76 | |
| 27 Extraordinary repairs: | | | | | |
| (a) Hull. | 114.60 | 1,218.35 | 62.16 | | 5,725.09 |
| (b) Machinery. | 150.82 | 221.10 | | | 286.45 |
| 28. Alterations and addi-
tions: | | | | | |
| (a) Hull. | | | 13.80 | | |
| (b) Machinery. | 5 695.69 | | | | 135.65 |
| 29. Laundry, ice, and mis-
cellaneous expenses. | 40.29 | 63.23 | | 1.00 | 756.25 |
| 30. Office expenses. | 377.55 | 753.99 | | | 250.62 |
| 31. Total. | \$5,004. | \$2,831. | \$1,286.78 | \$328.62 | \$15,047.29 |
| 32. Cost of coal per ton. | | | \$4.40 per short ton. | \$6.70 | \$4.23 per short ton. |
| 33. Cost of oil per gallon. | | | Lubricating, 30 cents. | Kerosene 12 cents, lubricat-
ing 76 cents. | Kerosene, 8 cents; lubricat-
ing 59 cents. |
| 34. By whom were repairs
made. | John Rourke & Sons | John Rourke & Sons | United States at Grand Ha-
ven, Johnston Bros.,
Ferryburg, Mich., etc. | Hired labor. | Walter H. Oades, Detroit,
Mich.; The Holt Electric
Co., Milwaukee, Wis.; and
Johnston Bros., Ferry-
burg, Mich., etc. |

TABLE XIV.—Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Gem. | Gibbons. | Gillmore, General. | Guendolen. | Hancock. |
|--|---|--|--|--|--|
| OPERATING COST—contd. | | | | | |
| 35. Number of days under steam. | 240..... | 271..... | 173..... | 90..... | 195. |
| 36. Remarks on work done by tug during year. | See Remarks.

<i>Remarks.</i>
Used on surveys pertaining to Savannah Harbor and edge cut inside waterways.
No regular subsistence furnished.
New boiler purchased. | See Remarks.

<i>Remarks.</i>
Used as tender to United States pipe-line dredge Morgan. Transferred by Quartermaster Department. | Used as tender and to tow dredge.

<i>Remarks.</i>
Grand River, Grand Haven Harbor, and Muskegon Harbor, Mich.
Rebuilt in 1906. Nothing used from old boat except boiler.
Cost of rebuilding in 1906. | See below.....

<i>Remarks.</i>
At Erie Harbor, Pa., as inspection boat, and on surveillance of Presque Isle Peninsula. | Engaged on survey and inspection work.

<i>Remarks.</i>
Harbors on east shore of Lake Michigan. |

| Name | Forrest Harding. | Col. Herwood. | Industry. | Inspector, M. R. C. | Lemont. |
|--|------------------------------|--------------------------------|--------------------------------|--|--|
| 1. District. | Mobile, Ala. | Boston, Mass. | Millwaukee, Wis. | St. Louis, Mo., Mississippi River Commission. | New York. |
| 2. Where built. | Pascagoula, Miss. | South Portland, Me. | Manitowoc, Wis. | Charleston, W. Va. | Camden, N. J. |
| 3. When built. | 1906 | 1898 | 1890 | 1913-1915 | 1893. |
| 4. Builder. | George R. Thompson. | Unknown; purchased secondhand. | Unknown. | The Charles Ward Engineering Works. | John H. Diabague & Son. |
| 5. Time to build. | 6 months. | Unknown. | do. | 25 months. | 4 months. |
| 6. Where purchased. | Mobile, Ala. | Portland, Me. | Menominee, Mich. | | |
| 7. When purchased. | 1910 | Nov. 24, 1905. | 1899 | | |
| 8. From whom purchased. | Lee Kimball. | Geo. A. Wyer. | Ludington, Wells & Van Schalk. | | |
| 9. Purchase price. | \$22,500. | \$7,500. | \$5,000. | Steel. | Steel. |
| 10. Material of hull. | Wood (pine and cypress). | Wood. | Wood. | Do. | Do. |
| 11. Material of house. | do. | do. | do. | | |
| 12. Contract cost. | | Unknown. | Unknown. | \$61,500. | \$37,500. |
| 13. Cost of outfit. | Included in purchase price. | Unknown; came with boat. | Unknown. | \$2,300. | \$16,000. |
| 14. Present value. | \$13,000. | \$4,500. | \$4,000. | \$62,000. | |
| 15. Hull: | | | | | |
| (a) Length over all. | 90 feet 6 inches. | 80 feet. | 71 feet 8 inches. | 144 feet. | 106 feet 8½ inches. |
| (b) Length on water line. | 83 feet 6 inches. | 74 feet (about). | 63 feet. | 144 feet. | 100 feet. |
| (c) Beam over all. | 25 feet 1 inch. | 17 feet 8 inches. | 16 feet. | 26 feet 10 inches. | 22 feet 11 inches. |
| (d) Beam on water line. | 21 feet 7 inches. | 16 feet 3 inches. | 16 feet. | 26 feet. | 22 feet. |
| (e) Molded depth amidship. | 10 feet 6 inches. | 9 feet 6 inches. | 7 feet 10 inches. | 6 feet. | 12 feet 6 inches. |
| (f) Depth of keel outside of hull. | 4 inches. | 6 inches. | 4 inches. | 7 inches. | 6 inches. |
| (g) Draft forward. | 6 feet 4 inches. | 5 feet. | 6 feet 3 inches. | 2 feet 8 inches. | 8 feet. |
| (h) Draft aft. | 8 feet 2 inches. | 8 feet 4 inches. | 8 feet 9 inches. | 2 feet 9 inches. | 9 feet 6 inches. |
| (i) Displacement (long tons). | 215. | 107. | 110. | 288. | 216. |
| 16. Engines: | | | | | |
| (a) Number and type of propelling engines. | 1 compound. | 1 fore-and-aft compound. | 1 noncondensing. | 2 vertical or marine, triple compound, condensing. | 1 fore-and-aft compound. |
| (b) Dimensions of cylinders and stroke. | 15 and 26 by 18-inch stroke. | 9½, 19½, and 14-inch stroke. | 20 by 20 inches. | 10, 15½, and 26½ inch; 18-inch stroke. | High pressure, 16 inches; low pressure, 32 inches; stroke, 2 feet. |
| (c) Revolutions per minute (average). | 110. | 155. | 120. | 185. | 100. |
| (d) Total horsepower. | 184. | 125. | 100. | 700. | 462. |
| 17. Propeller: | | | | | |
| (a) Diameter. | 7 feet. | 5 feet 9 inches. | 7 feet. | 5½ feet. | 8 feet. |
| (b) Number of blades. | 4. | 4. | 4. | 4. | 4. |
| (c) Pitch. | 6 feet. | 7 feet 9 inches. | 9 feet. | 8 feet. | 10 feet 6 inches. |

TABLE XIV.—Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Horace Harding. | Col. Harwood. | Industry. | Inspector, M. R. C. | Lemont. |
|---|---|--|---|---|--|
| 18. Boilers:
(a) Number and type.....
(b) Dimensions.....
(c) Number and diameter of tubes in one boiler.....
(d) Heating surface.....
(e) Grate surface.....
(f) Steam pressure.....
19. Speed in miles per hour.....
20. Towing capacity..... | 1 Scotch marine water back. Length, 11 feet; diameter, 9 feet 6 inches.
101 of 3 inches diameter.....

1,161 square feet.
46 square feet.
135 pounds.
10.....
Dredge and accompanying plant. | 1 upright. 6 feet 6 inches diameter, 8 feet 4 inches high.
202, 2 inches diameter.....

900 square feet.
26.7 square feet.
150 pounds.
11.....
3 tons, static pull. | 1 marine fire box. 12 feet long, 6 feet 6 inches diameter.
106, 3 inches diameter.....

1,000 square feet.
27.5 square feet.
135 pounds.
12.....
Tows dredge Kewanee 4 miles per hour. | 2 Ward water tube 8 by 10 feet.....
14, 4-inch, and 304, 2-inch.....

3,950 square feet.
91 square feet.
200 pounds.
12.5.....
6 barges. | 1 Scotch. 11 feet diameter, 11½ feet long.
170, 3 inches diameter.

1,715 square feet.
49 square feet.
120 pounds.
12.....

\$7,659.83
1,625.24
712.85
3,425.50
170.10
87.34
1,615.04

\$15,286.90 |
| OPERATING COST. | | | | | |
| 21. Pay roll..... | \$3,812.05 | (1) | \$5,089.17 | \$6,801.72 | |
| 22. Supplies:
(a) Subistence.....
(b) Engine room.....
(c) Boiler room.....
(d) Miscellaneous..... | 852.01
190.44
105.77
1,181.38 | | 929.51
30.60
5.14
234.02
2,661.71 | 1,550.90
151.12
40.00
102.64
2,748.28 | |
| 23. Coal..... | | | 2.83 | | |
| 24. Oil:
(a) Kerosene.....
(b) Lubricating..... | | | 65.89 | | |
| 25. Water..... | 16.49 | | | | |
| 26. Ordinary repairs:
(a) Hull.....
(b) Machinery..... | 62.19
129.74 | | 311.85
206.89 | 467.25
1,059.68 | |
| 27. Extraordinary repairs:
(a) Hull.....
(b) Machinery..... | 181.95
54.35 | | | 915.51 | |
| 28. Alterations and additions:
(a) Hull.....
(b) Machinery..... | | | 147.00 | | |
| 29. Laundry, for, and miscellaneous expenses..... | 44.35 | | 53.25 | | |
| 30. Office expenses..... | | | 496.58 | 301.91 | |
| 31. Total..... | \$6,531.67 | (1) | \$10,427.51 | \$14,126.35 | |
| 32. Cost of coal per ton..... | \$1.85 to \$2.19. | None used. | \$4.22 per short ton. | \$2.58. | \$1.25, average. |
| 33. Cost of oil per gallon..... | No oil used as fuel. | do. | Lubricating, 42 cents; kerosene, 7.7 cents. | | |

| made. | <p>35. Number of days under steam.</p> <p>36. Remarks on work done by tug during year.</p> | <p>Miss. assisted by crew of tug and A. Blumer, Moss Point, Miss.</p> <p>188 days.</p> <p>Tender for dredge.</p> | <p>Out of commission.</p> <p>Did no work.</p> | <p>264.</p> <p>See Remarks.</p> | <p>144.</p> <p>235 days of 24 hours.</p> <p>Patrol duty.</p> | <p><i>Remarks.</i></p> <p>The boat acted as tender for dredge Wehshak in Mobile Harbor and Channel connecting Mobile Bay and Mississippi Sound during the first four months until plant was laid up. The latter part of the year this tug was attached to the dredge Pascagoula, improving harbors along the Mississippi coast.</p> <p><i>Remarks.</i></p> <p>None, out of commission.</p> <p><i>Remarks.</i></p> <p>Operated at various harbors in the Milwaukee district attending dredge Keewaunee.</p> <p><i>Remarks.</i></p> <p>Used as inspection boat in connection with dredging operations, Mississippi River below Cairo, Ill.</p> <p><i>Remarks.</i></p> <p>Patrol duty New York Bay and Harbor and seaward 5 miles outside Scotland Lightship.</p> |
|-------|--|--|---|---------------------------------|--|--|
|-------|--|--|---|---------------------------------|--|--|

TABLE XIV.—Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Gen. G. J. Lydecker..... | Col. J. L. Lusk..... | Manacac..... | Manitaca..... | Manitowoc..... |
|--|--|---|--|--------------------------------------|------------------------------|
| 1. District..... | Detroit, Mich..... | Detroit, Mich. (Lake Survey), Mich..... | New Orleans (fourth Mississippi R. I.), La., Ky..... | Second, New York..... | Milwaukee, Wis..... |
| 2. Where built..... | Boston, Mass..... | Manitowoc, Mich..... | Paducah, Ky..... | Noank, Conn..... | Manitowoc, Wis..... |
| 3. When built..... | 1903..... | 1884..... | 1886..... | 1888..... | 1900..... |
| 4. Builder..... | Lawley & Sons..... | Unknown..... | No. 101 Machine Works..... | Robert Palmer Sons..... | Manitowoc Dry Dock Co..... |
| 5. Time to build..... | Toledo, Ohio..... | do..... | Unknown..... | Not known..... | 7½ months..... |
| 6. When purchased..... | May, 1913..... | Manitowoc, Mich..... | Paducah, Ky..... | Peacedale, R. I..... | |
| 7. From whom purchased..... | Edward Ford..... | Unknown..... | 1887..... | 1900..... | |
| 8. Purchase price..... | \$32,000..... | do..... | Broadfoot Bros..... | Narragansett Pier Navigation Co..... | |
| 9. Material of hull..... | Wood..... | Wood..... | \$6,555..... | \$19,500..... | Steel..... |
| 10. Material of house..... | do..... | do..... | Wood..... | Wood..... | Wood..... |
| 11. Material of hull..... | do..... | do..... | do..... | do..... | \$30,000..... |
| 12. Contract cost..... | Included in cost of camera..... | Unknown..... | Included in purchase price..... | do..... | \$1,213.50..... |
| 13. Cost of outfit..... | \$20,000..... | \$17,000..... | \$2,000..... | \$14,500..... | \$30,000..... |
| 14. Present value..... | 125 feet..... | 123 feet 11 inches..... | 78 feet..... | 106 feet..... | 100 feet..... |
| 15. Hull: | (a) Length over all..... | 117 feet 10 inches..... | 76 feet..... | 102 feet..... | 91 feet 6 inches..... |
| (b) Length on water line..... | 18 feet 3 inches..... | 19 feet 4 inches..... | 17 feet..... | 22 feet..... | 21 feet 6 inches..... |
| (c) Beam over all..... | 16 feet 7 inches..... | 15 feet 6 inches..... | 16 feet..... | 17 feet..... | 19 feet 8 inches..... |
| (d) Beam on water line..... | 10 feet..... | 11 feet 10 inches..... | 7 feet..... | 9 feet..... | 10 feet 7 inches..... |
| (e) Molded depth..... | 9 inches..... | 7 feet 9 inches..... | 6 inches..... | 6 inches..... | 6 inches..... |
| (f) Depth of keel outside of hull..... | 5 feet..... | 10 feet 11 inches..... | 4 feet 4 inches..... | 6 feet..... | 6 feet 7 inches..... |
| (g) Draft forward..... | 6 feet 2 inches..... | 25..... | 8 feet 6 inches..... | 8 feet 6 inches..... | 9 feet 4½ inches..... |
| (h) Draft aft..... | 120..... | 235..... | 113..... | 225..... | 200..... |
| (i) Displacement (long tons)..... | | | | | |
| 16. Engines: | | | | | |
| (a) Number and type of propelling engines..... | 2 triple expansion..... | 1 steelp compound..... | 1 high pressure..... | 1 compound..... | 1 fore-and-aft compound..... |
| (b) Dimensions of cylinders and stroke..... | 8½ by 13 inches; 21½ by 10½ inches stroke..... | 19 by 26 inches diameter, 26-inch stroke..... | 16 by 16 inches..... | 14 by 28 by 18 inches..... | 16 by 33 by 24 inches..... |
| (c) Revolutions per minute (average)..... | 275..... | 110..... | 130..... | 145..... | 130..... |
| (d) Total horsepower..... | 750 at 250 pounds pressure..... | Unknown..... | 123 nominal..... | About 400..... | 520..... |

| | | | | | |
|---|--|---|---|--|---|
| 17. Propeller:
(a) Diameter.....
(b) Number of blades.....
(c) Pitch..... | 48 inches.....
7 feet.....
4..... | 8½ feet.....
4.....
12½ feet..... | 6 feet.....
4.....
9 feet..... | 78 inches.....
4.....
About 11 feet..... | 7 feet.....
4.....
11 feet..... |
| 18. Bolters:
(a) Number and type.....
(b) Dimensions.....
(c) Number and diameter of rollers.....
(d) Heating surface.....
(e) Grate surface.....
(f) Steam pressure.....
(g) Speed in miles per hour.....
(h) Towing capacity..... | 1 Roberts water tube.....
9 feet 6 inches by 8 feet.....
60 coil tubes, 14 inches in diameter.....
1,700 square feet.....
36 square feet.....
250-30.....
12.5.....
Fair..... | 1 Scotch.....
12 feet long, 10½ feet diameter.....
164 of 3½-inch diameter.....
1,650 square feet.....
48 square feet.....
150 pounds.....
11.....
Strong..... | 1 return flue.....
16 feet long, 5 feet diameter.....
20 of 6-inch diameter.....
875 square feet.....
25 square feet.....
100 pounds.....
500 tons up stream..... | 2 Roberts water tube.....
4 by 9 feet.....
1,750 square feet in 2 boilers.....
53 square feet in 2 boilers.....
175 pounds.....
12 (statute)..... | 1 Scotch marine.....
11 by 11 feet by 6 inches.....
160 of 2½-inch diameter.....
1,423 square feet.....
49 square feet.....
150 pounds.....
12.....
1,500 tons 6 miles per hour..... |
| OPERATING COST. | | | | | |
| 21. Pay roll..... | \$5,589.00 | \$7,429.21 | \$1,100.00 | \$19,756.93 | \$7,094.80 |
| 22. Supplies:
(a) Substistence.....
(b) Engine room.....
(c) Boiler room.....
(d) Miscellaneous..... | 1,137.63.....
151.00.....
451.96.....
1,550.43..... | 4.00.....
62.88.....
1,628.13..... | 13.00.....
2.75.....
189.00..... | 3,474.07.....
228.86.....
122.69.....
633.78.....
1,892.04..... | 1,394.53.....
56.40.....
12.00.....
531.27.....
3,104.43..... |
| 23. Coal..... | | | | | |
| 24. Oil:
(a) Kerosene.....
(b) Lubricating..... | 3.68.....
97.20..... | 21.33.....
40.68..... | 3.00.....
11.00..... | 23.96.....
106.29.....
52.00..... | 4.12.....
79.67..... |
| 25. Water..... | | | | | |
| 26. Ordinary repairs:
(a) Hull.....
(b) Machinery..... | 215.36.....
241.72..... | 1,513.18.....
133.14..... | 21.00..... | 1,116.44.....
204.60..... | 255.72.....
635.66..... |
| 27. Extraordinary repairs:
(a) Hull.....
(b) Machinery..... | | 1,162.11.....
27.15..... | 899.00.....
100.00..... | 668.10..... | 94.00.....
41.68..... |
| 28. Alterations and additions:
(a) Hull.....
(b) Machinery..... | | | | | 326.78.....
53.45.....
153.84..... |
| 29. Laundry, ice, and miscellaneous expenses..... | 148.01..... | 128.06..... | 5.00..... | 222.30..... | |
| 30. Office expenses..... | | 1,205.75..... | | 987.85..... | 690.16..... |
| 31. Total..... | \$9,575.89 | \$13,273.22 | \$2,343.75 | \$39,521.90 | \$14,493.35 |
| 32. Cost of coal per ton..... | \$3 to \$3.75..... | Kerosene, 9 cents; lubricating, 32.2 cents..... | \$3..... | \$4,104.2..... | \$4.12 short ton..... |
| 33. Cost of oil per gallon..... | Kerosene, 7½ cents; engine, 45 cents; cylinder, 69 cents..... | U. S. Life Survey and Geo. T. Crook, Detroit..... | \$0.50..... | Verdon & Co., Staten Island..... | Kerosene, 8 cents; lubricating, 50 cents..... |
| 34. By whom were repairs made..... | Local firms..... | | Engineer depot..... | | (1). |

TABLE XIV.—Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Gen. G. J. Lydickr. ¹ | Col. J. L. Lusk. | Manatee. | Manatee. | Manitowoc. |
|--|---|--|---|---|--|
| OPERATING COST—Contd. | | | | | |
| 35. Number of days under steam. | 76..... | 233..... | 90..... | 277 days..... | 235..... |
| 36. Remarks on work done by tug during year. | Inspection of harbors and surveys.

<i>Remarks.</i>
Operated in Detroit, Mich., district.
1 Formerly Gladwin. | See below.....

<i>Remarks.</i>
Engaged on surveys, Lake Huron, Saginaw Bay, etc. |

<i>Remarks.</i>
Held under steam at depot for fire prevention and miscellaneous shifting.
1 No regular crew employed. | Surveys, drift, etc.....

<i>Remarks.</i>
New York Harbor, N. Y., and Hudson and East Rivers below Harlem River.
1 Includes annual repairs at Verdon & Co.'s plant, Staten Island.
1 Includes new launch, \$399, and repairs after collision, \$99.10. | See remarks.

<i>Remarks.</i>
Transferring dredging and pile-driving plants between harbors; towing concrete caissons from Milwaukee to Racine, Wis.; transferring stone for riprapping breakwaters and piers (stone carried on tow barge Riprap) from Sturgeon Bay to various harbors on Lake Michigan; running on inspection trips; taking soundings at various harbors.
1 United States, Manitowoc Ship Building & Dry Dock Co., Hartmann-Greifling Co. |

| e. | Marengo. | | Mendall, G. H. | | Mareur. | | Moryansa. | | Noble, Alfred. | |
|--|--|--|---|--|--|--|---|--|---|--|
| | New Orleans (fourth Mississippi River).
Baltimore, Md.
1893. | | Second, Portland, Ore.
Portland, Ore.
Engines, 1892; boiler, 1904;
hull and house, 1912.
Joseph Sample
6 months and 24 days. | | Wilmington, N. C.
Clay Island, N. Y.
1892. | | Fourth Mississippi River.
Philadelphia, Pa.
1892. | | Detroit, Mich.
Toledo, Ohio.
1905. | |
| 1. District..... | New Orleans (fourth Mississippi River).
Baltimore, Md.
1893. | | Second, Portland, Ore.
Portland, Ore.
Engines, 1892; boiler, 1904;
hull and house, 1912.
Joseph Sample
6 months and 24 days. | | Wilmington, N. C.
Clay Island, N. Y.
1892. | | Fourth Mississippi River.
Philadelphia, Pa.
1892. | | Detroit, Mich.
Toledo, Ohio.
1905. | |
| 2. Where built..... | New Orleans (fourth Mississippi River).
Baltimore, Md.
1893. | | Second, Portland, Ore.
Portland, Ore.
Engines, 1892; boiler, 1904;
hull and house, 1912.
Joseph Sample
6 months and 24 days. | | Wilmington, N. C.
Clay Island, N. Y.
1892. | | Fourth Mississippi River.
Philadelphia, Pa.
1892. | | Detroit, Mich.
Toledo, Ohio.
1905. | |
| 3. When built..... | New Orleans (fourth Mississippi River).
Baltimore, Md.
1893. | | Second, Portland, Ore.
Portland, Ore.
Engines, 1892; boiler, 1904;
hull and house, 1912.
Joseph Sample
6 months and 24 days. | | Wilmington, N. C.
Clay Island, N. Y.
1892. | | Fourth Mississippi River.
Philadelphia, Pa.
1892. | | Detroit, Mich.
Toledo, Ohio.
1905. | |
| 4. Builder..... | R. M. Spedden & Co.
Unknown.
1902. | | R. M. Spedden & Co.
Unknown.
1902. | | Henry Piegras.
Unknown.
1902. | | Neale & Levy.
Unknown.
1902. | | Craig Ship Building Co.
3 months.
Toledo, Ohio.
August, 1905. | |
| 5. Time to build..... | R. M. Spedden & Co.
Unknown.
1902. | | R. M. Spedden & Co.
Unknown.
1902. | | Henry Piegras.
Unknown.
1902. | | Neale & Levy.
Unknown.
1902. | | Craig Ship Building Co.
3 months.
Toledo, Ohio.
August, 1905. | |
| 6. Where purchased..... | R. M. Spedden & Co.
Unknown.
1902. | | R. M. Spedden & Co.
Unknown.
1902. | | Henry Piegras.
Unknown.
1902. | | Neale & Levy.
Unknown.
1902. | | Craig Ship Building Co.
3 months.
Toledo, Ohio.
August, 1905. | |
| 7. When purchased..... | R. M. Spedden & Co.
Unknown.
1902. | | R. M. Spedden & Co.
Unknown.
1902. | | Henry Piegras.
Unknown.
1902. | | Neale & Levy.
Unknown.
1902. | | Craig Ship Building Co.
3 months.
Toledo, Ohio.
August, 1905. | |
| 8. From whom purchased..... | R. M. Spedden & Co.
Unknown.
1902. | | R. M. Spedden & Co.
Unknown.
1902. | | Henry Piegras.
Unknown.
1902. | | Neale & Levy.
Unknown.
1902. | | Craig Ship Building Co.
3 months.
Toledo, Ohio.
August, 1905. | |
| 9. Purchase price..... | R. M. Spedden & Co.
Unknown.
1902. | | R. M. Spedden & Co.
Unknown.
1902. | | Henry Piegras.
Unknown.
1902. | | Neale & Levy.
Unknown.
1902. | | Craig Ship Building Co.
3 months.
Toledo, Ohio.
August, 1905. | |
| 10. Material of hull..... | Steel.
\$15,000. | | Steel.
\$15,000. | | Steel.
\$11,000. | | Steel.
\$30,000. | | Steel.
\$19,800. | |
| 11. Material of house..... | Wood.
\$34,750. | | Wood.
\$34,750. | | Wood.
\$11,000. | | Steel.
\$30,000. | | Steel.
\$19,800. | |
| 12. Contract cost..... | Included in purchase price.
\$10,000. | | Included in purchase price.
\$10,000. | | Included in purchase price.
\$6,750. | | Included in purchase price.
\$24,000. | | Included in price of vessel.
\$14,000. | |
| 13. Cost of outfit..... | Included in purchase price.
\$10,000. | | Included in purchase price.
\$10,000. | | Included in purchase price.
\$6,750. | | Included in purchase price.
\$24,000. | | Included in price of vessel.
\$14,000. | |
| 14. Present value..... | Included in purchase price.
\$10,000. | | Included in purchase price.
\$10,000. | | Included in purchase price.
\$6,750. | | Included in purchase price.
\$24,000. | | Included in price of vessel.
\$14,000. | |
| 15. Hull: | | | | | | | | | | |
| (a) Length over all..... | 82 feet. | | 101 feet. | | 83 feet. | | 94 feet. | | 76 feet 6 inches. | |
| (b) Length on water line..... | 75 feet 4 inches. | | 94 feet 3 inches. | | 77 feet 6 inches. | | 87 feet. | | 71 feet 6 inches. | |
| (c) Beam over all..... | 19 feet 4 inches. | | 21 feet 2 inches. | | 13 feet 10 inches. | | 20 feet 4 inches. | | 15 feet 6 inches. | |
| (d) Beam on water line..... | 18 feet 2 inches. | | 19 feet 6 inches. | | 12 feet 10 inches. | | 19 feet. | | 15 feet 2 inches. | |
| (e) Molded depth amidship..... | 8 feet 8 inches. | | 10 feet. | | 7 feet. | | 10 feet 3 inches. | | 7 feet. | |
| (f) Depth of keel outside of hull..... | 3 inches. | | 10 inches. | | 6 inches. | | 4 inches. | | 6 inches. | |
| (g) Draft forward..... | 6 feet 2 inches. | | 6 feet 10 inches. | | 4 feet. | | 6 feet. | | 6 feet 21 inches. | |
| (h) Draft aft..... | 8 feet 1 inch. | | 7 feet 2 inches. | | 5 feet 6 inches. | | 9 feet 3 inches. | | 7 feet 6 inches. | |
| (i) Displacement (long tons)..... | 137. | | 150. | | 60. | | 180. | | 83. | |
| 16. Engines: | | | | | | | | | | |
| (a) Number and type of propelling engines..... | 1 Steamer compound. | | 1 fore-and-aft compound. | | 1 triple-expansion. | | 1 fore-and-aft compound. | | 1 vertical, inverted, direct-acting, open-front, surface-condensing, fore-and-aft compound. | |
| (b) Dimensions of cylinders and stroke..... | 12 inches and 22 by 20 inches. | | 12½ by 22½ by 18 inch stroke. | | 8 by 11½ by 19 inches, 11-inch stroke. | | 15 inches and 26 by 22 inches. | | 12 and 24 inches diameter, 16-inch stroke. | |
| (c) Revolutions per minute (average)..... | 155. | | 140. | | 260. | | 137. | | 180. | |
| (d) Total horsepower..... | 175 nominal. | | 200. | | 135. | | 230 nominal. | | 200. | |
| 17. Propeller: | | | | | | | | | | |
| (a) Diameter..... | 6 feet 6 inches. | | 72 inches. | | 4 feet. | | 7 feet 2 inches. | | 5.5 feet. | |
| (b) Number of blades..... | 4. | | 4. | | 4. | | 7. | | 4. | |
| (c) Pitch..... | 10 feet. | | Unknown. | | 6 feet. | | 11 feet. | | 7.5 feet. | |

TABLE XIV.—Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Marengo. | Mendall, G. H. | Mercer. | Maryanza. | Noble, Alfred. |
|---|---|---|--|---|--|
| 18. Boilers:
(a) Number and type.....
(b) Dimensions.....
(c) Number and diameter of tubes.....
(d) Heating surface.....
In 1 boiler.....
Grate surface.....
Steam pressure.....
19. Speed in miles per hour.....
20. Towing capacity..... | 1 Scotch marine.....
11 feet long, 8 feet diameter.....
124 of 3 inches diameter.....
905 square feet.....
36 square feet.....
150 pounds.....
111.....
1,200 tons upstream..... | 1 Scotch marine.....
9 feet 3 inches diameter by 10 feet 6 inches long.....
140 of 3 inches diameter.....
997 square feet.....
39 square feet.....
125 pounds.....
12.....
1,200 tons..... | 1 Robertis water tube.....
6 by 8 feet.....
Water tube boiler.....
1,657 square feet.....
48.78 square feet.....
200 pounds.....
13.....
Not suitable for towing..... | 1 Scotch marine.....
12 feet long, 10 feet 3 inches diameter.....
164 of 3 inches diameter.....
1,256 square feet.....
443 square feet.....
125 pounds.....
13.....
1,500 tons upstream..... | 1 Robertis water tube.....
8 feet square, 9 feet high.....
42 horizontal coils 2-inch pipe risers, 14 inches; mud drain, 6 inches.....
29.5 square feet.....
200 pounds.....
12.....
Good..... |
| OPERATING COST. | | | | | |
| 21. Pay roll..... | \$2,957.50 | \$7,185.97 | \$3,400.33 | \$1,576.30 | \$2,769.06 |
| 22. Supplies: | | | | | |
| (a) Subsistence..... | 711.90 | 1,980.40 | 2,275.24 | 392.00 | 491.38 |
| (b) Engine room..... | 13.70 | 281.77 | 54.04 | 35.00 | 21.73 |
| (c) Pilot room..... | | 151.27 | | 3.75 | 80.45 |
| Miscellaneous..... | 24.82 | 370.48 | 60.28 | | 895.80 |
| 23. Coal..... | 3,063.72 | 1,213.87 | 1,403.66 | 1,425.00 | |
| 24. Oil: | | | | | |
| (a) Kerosene..... | 14.94 | 9.06 | 1.20 | 3.00 | 1.44 |
| (b) Lubricating..... | 128.06 | 17.94 | 30.00 | 22.50 | 24.36 |
| 25. Water..... | | 9.50 | | | |
| 26. Ordinary repairs: | | | | | |
| (a) Hull..... | 910.00 | 2.26 | 631.99 | 582.00 | 240.49 |
| (b) Machinery..... | 547.00 | 40.21 | 800.99 | 919.00 | 381.38 |
| 27. Extraordinary repairs: | | | | | |
| (a) Hull..... | | \$611.20 | | | |
| (b) Machinery..... | | \$580.80 | | | |
| 28. Alterations and additions: | | | | | |
| (a) Hull..... | | \$1,392.10 | | | |
| (b) Machinery..... | | \$971.50 | 148.12 | | |
| 29. Laundry, ice, and miscellaneous expenses..... | 40.15 | 119.97 | 163.28 | 54.00 | 14.26 |
| 30. Office expenses..... | | 163.79 | | | |
| 31. Total..... | \$8,406.79 | \$16,013.07 | \$7.60 | \$5,015.95 | \$4,922.30 |
| 32. Cost of coal per ton..... | \$4.50 | \$6; fuel oil, \$1.10 per barrel of 42 U. S. gallons. | | \$4.25 | \$2.90 and \$3.20. |

| 34. By whom were repairs made. | Aug. 30 cents. | Operating, 3/4 cents. | U. S. employees. | U. S. engineers. | 18 cents; hard, 90 cents; kerosene, 8 cents. Government employees and local machine shops. |
|--|----------------|---|--|---|--|
| Engineer Depot. | 312. | Helser and Unden and Portland Boiler Works, Portland, Ore. | 136. | 112. | 206. |
| 224. | | Surveying and towing. | Used for superintendence and surveys. | Excellent. | Towing scows in harbor and inspection, St. Marys River |
| Towing plant and mattresses for bank revetment. | | | | | |
| Remarks. | | Remarks. | Remarks. | Remarks. | Remarks. |
| Operated between New Orleans and Vicksburg; principally between Natchez and Vicksburg. | | Operated on Columbia and lower Wiamette Rivers, below Portland, Ore., and at mouth of Columbia River, Ore. and Wash. Includes fuel oil.
* Dry-docking, new propeller sheathing, etc.
* Removing boiler tubes, overhauling storage battery, etc.
* Installation of fuel-oil tanks.
* Installation of fuel-oil pumps, burners, etc. The boat was equipped to burn fuel oil Nov. 15, 1916. | Used for superintendence and surveys, Cape Fear River and tributaries. | Towing rock barges, mattresses, etc.; placing mattresses in position for sinking, Passes and Grand Bay. | Operated on St. Marys Falls Canal and St. Marys River, Mich. |

TABLE XIV.—*Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending December 31, 1916—Continued.*

| Name..... | Nimrod. | Parker. | Philadelphia. | Pickel. | Pontomier. |
|--|-----------------------------|-------------------------------------|----------------------------|-----------------------------------|--|
| 1. District..... | New York. | Third, Mississippi River. | Philadelphia, Pa. | New Orleans, La. | Washington Barracks, D. C. |
| 2. Where built..... | New York. | St. Louis, Mo. | Wilmington, Del. | do. | New York City. |
| 3. When built..... | 1900. | 1885. | 1894. | 1908. | 1908. |
| 4. Builder..... | Henry Crew. | Not known. | Fussy & Jones Co. | Johnson Iron Works. | Gas Engine & Power Co. and
Chas. L. Seabury & Sons
Co. |
| 5. Time to build..... | 3 months. | do. | 8 months. | 9 months 22 days. | Unknown. |
| 6. Where purchased..... | New York. | St. Louis, Mo. | do. | do. | New York City. |
| 7. When purchased..... | 1900. | 1886. | do. | do. | 1908. |
| 8. From whom purchased..... | Hunter, Benn & Co. | Not known. | do. | do. | Builders. |
| 9. Purchase price..... | \$9,500. | do. | do. | do. | \$18,750. |
| 10. Material of hull..... | Wood. | do. | Steel. | Wood. | Steel. |
| 11. Material of house..... | do. | do. | Wood. | do. | Plank house, wood; deck
planks, steel. |
| 12. Contract cost..... | \$1,000. | Not known. | \$15,987.81. | \$7,189. | \$18,135. |
| 13. Cost of outfit..... | \$5,000. | do. | Included in contract cost. | do. | Included in purchase price. |
| 14. Present value..... | do. | do. | \$7,800. | \$4,500. | \$9,000. |
| 15. Hull: | | | | | |
| (a) Length over all..... | 108 feet 11 inches. | 69 feet 5 inches. | 67 feet. | 52 feet 5 inches. | 80 feet. |
| (b) Length on water line..... | 95 feet. | 65 feet. | 62 feet 6 inches. | 48 feet 5 inches. | 72 feet 6 inches. |
| (c) Beam over all..... | 22 feet 7½ inches. | 17 feet 4 inches. | 16 feet. | 12 feet 6 inches. | 18 feet. |
| (d) Beam on water line..... | 19 feet 2½ inches. | 16 feet. | do. | 11 feet 11 inches. | 17 feet 6 inches. |
| (e) Moulded depth amidship..... | 10 feet 8 inches. | 7 feet 2 inches. | 7 feet 6 inches. | 6 feet 3 inches. | 8 feet. |
| (f) Depth of keel outside of hull..... | 6 inches. | None. | 6 inches. | 4 inches. | None amidship. |
| (g) Draft forward..... | 8 feet. | 4 feet. | 5 feet 4 inches. | 3 feet 8 inches. | 2 feet. |
| (h) Draft aft..... | 10 feet. | 5 feet. | 8 feet 4 inches. | 4 feet 6 inches. | 2 feet 6 inches. |
| (i) Displacement (long tons)..... | 245. | 98. | 56. | 32. | 50. |
| 16. Engines: | | | | | |
| (a) Number and type of propelling engines..... | 1 fore-and-aft compound. | 1 upright marine, high pressure. | 1; single. | 1 vertical compound. | 2 compound, condensing. |
| (b) Dimensions of cylinders and stroke..... | 17 by 34 by 24 inch stroke. | 18 inches diameter, 18-inch stroke. | 13 by 15 inches. | 6 and 12 inches by 9-inch stroke. | 6 and 12 inches by 9-inch stroke. |
| (c) Revolutions per minute (average)..... | 100. | 120. | 150. | 225. | 260. |
| (d) Total horsepower..... | 450. | 200. | 125. | 50. | 125. |

| | | | | | |
|---|---------------------------------|---|--|---|-----------------------------|
| 17. Propeller: | 7 feet 8 inches..... | 6 feet..... | 5 feet..... | 3 feet 3 inches..... | 2 feet 1 inch (twin screw). |
| (a) Diameter..... | 4..... | 4..... | 4..... | 4..... | 3..... |
| (b) Number of blades..... | 11 feet 6 inches..... | 10 feet..... | 7 feet 6 inches..... | 4 feet 6 inches..... | Unknown. |
| (c) Pitch..... | 1 Roberts water tube..... | 2 Mississippi River return flue..... | 1 Scotch tubular..... | 1 Scotch marine return tubular..... | 1 water tube |
| 18. Bolts: | 9 by 9 feet..... | 40 inches by 14 feet..... | 7 feet 8 inches long, 10 feet diameter..... | 7½ feet long by 5 feet diameter..... | 6 by 6 by 5 feet. |
| (a) Number and type..... | 690 of 1½, 2, and 3 inches..... | Two 11 inches and three 6 inches..... | 90; 3 inches..... | 48 tubes 2½ inches..... | 440; ½ inch. |
| (b) Dimensions..... | 2,300 square feet..... | 544 square feet..... | 756 square feet..... | 224 square feet..... | 750 square feet. |
| (c) Number and diameter of tubes in one boiler..... | 554 square feet..... | 32 square feet..... | 21 square feet..... | 8 square feet..... | 17½ square feet. |
| (d) Heating surface..... | 115 pounds..... | 183 pounds..... | 150 pounds..... | 150 pounds..... | 200 pounds. |
| (e) Grate surface..... | 9..... | 7..... | 11..... | 7..... | 10. |
| (f) Steam pressure..... | 19..... | 500 tons up stream; 1,000 tons down stream..... | 250 tons..... | 130 tons..... | Small. |
| (g) Speed in miles per hour..... | | | | | |
| 19. Spindle miles per hour..... | | | | | |
| 20. Towing capacity..... | | | | | |
| OPERATING COST. | | | | | |
| 21. Pay roll..... | \$7,129.83 | \$960.44 | \$4,752.98 | \$2,793.07 | \$1,622.49 |
| 22. Supplies: | | | | | |
| (a) Subistence..... | 1,694.73 | 130.77 | 1,594.84 | 367.45 | 59.00 |
| (b) Engine room..... | 474.42 | 9.00 | 185.53 | 165.84 | 18.50 |
| (c) Boiler room..... | | | 186.12 | 107.86 | |
| (d) Miscellaneous..... | 3,438.25 | 308.87 | 445.43 | 136.90 | |
| 23. Coal..... | | | 1,906.88 | 433.20 | 1,461.34 |
| 24. Oil: | | | | | |
| (a) Kerosene..... | 170.69 | | 17.19 | 8.63 | 5.00 |
| (b) Lubricating..... | 92.00 | | 49.88 | 30.82 | 56.00 |
| 25. Water..... | | | | | |
| 26. Ordinary repairs: | | | | | |
| (a) Hull..... | 424.95 | 46.58 | 20.90 | 156.35 | 220.00 |
| (b) Machinery..... | | 73.47 | 22.61 | 123.37 | 443.00 |
| 27. Extraordinary repairs: | | | | | |
| (a) Hull..... | | | 441.27 | 32.00 | |
| (b) Machinery..... | | | 738.61 | 110.00 | |
| 28. Alterations and additions: | | | | | |
| (a) Hull..... | | | 7.61 | | |
| (b) Machinery..... | | | | | |
| 29. Laundry, fuel, and miscellaneous expenses..... | | | 74.27 | 28.71 | 68.60 |
| 30. Office expenses..... | | | 1,115.10 | 143.76 | 145.00 |
| 31. Total..... | \$13,364.87 | \$1,255.83 | \$11,536.22 | \$4,659.96 | \$3,101.83 |
| 32. Cost of coal per ton..... | \$4.25 | \$3.25 | \$3.25 | \$3.40 | \$5.85. |
| 33. Cost of oil per gallon..... | | \$3.00 to 60 cents. | Kerosene, 9 cents; cylinder, 40 cents; engine, 33 cents; dynamo, 36 cents. | Kerosene, 8 and 9 cents; engine, 31 cents; cylinder, 44 and 42 cents. | 29½ cents. |

TABLE XIV.—Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| Name. | Nimrod. | Parker. | Philadelphia. | Pickett. | Pontolier. |
|--|--|--|---|--|--|
| OPERATING COST—contd. | | | | | |
| 34. By whom were repairs made. | Navy yard, New York..... | United States fleet at Vicksburg. | Quigley & Darp, Camden, N. J. | U. S. Engineer Department, Bureau of Ordnance, and New Orleans Electric Welding Co. 283 | Machinist shop in Washington, D. C. |
| 35. Number of days under steam. | 283 (days of 24 hours)..... | 90..... | 310..... | Making surveys and current observations at Southwest Pass, Mississippi River. | 45. |
| 36. Remarks on work done by tug during year. | Patrol duty..... | (1)..... | Survey work and tender to floating plant. | Remarks.
Insulation of boiler and piping entirely renewed and five cracks in boiler electrically welded, and bottom cleaned, painted, and repaired. | See Remarks below. |
| | Remarks.
Patrol duty New York Bay and Harbor. | Remarks.
1 Harbor tug at United States fleet at Vicksburg until Apr. 1, when she was condemned as being unworthy. | Remarks.
In Delaware River above and below Philadelphia, Pa. | | Remarks.
Running between Washington Barracks, D. C., Fort Foot's, Md. and Balvoir, Va., in connection with the instruction of Engineer troops at the Engineer School, and for transporting Engineer troops between Washington, D. C., and Balvoir, Va., in connection with field training and target practice. Supplied and paid for by the Quartermaster's Department. |

| Name | Post, J. C. | Quant. | Rece, General. | Rumsey, James. | Son Lutz. |
|--|-------------------------------------|---|--------------------------------------|--|---|
| 1. Pilot. | Second, Portland, Ore. | Cleveland, Ohio. | New Orleans, La. | Wheeling, W. Va. | Galveston, Tex. |
| 2. Where built. | Astoria, Ore. | Astoria, Ore. | 1876. | 1903. | Baltimore, Md. |
| 3. When built. | 1913. | Completed by hired labor. | Unknown. | Charles Ward. | 1911. |
| 4. Builder. | Wilson Bros. | Build and wood work by J. G. Laird & Son. | Unknown. | Charles Ward. | Spedden Ship Building Co. |
| 5. Time to build. | 8 months. | Unknown. | do. | 2 years 3 months (1900-1903). | No record. |
| 6. Where purchased. | do. | do. | do. | (harleston, W. Va. | Baltimore, Md. |
| 7. When purchased. | do. | do. | do. | 1903. | Jan. 3, 1914. |
| 8. From whom purchased. | do. | do. | do. | (Charles Ward. | Spedden Ship Building Co. |
| 9. Purchase price. | do. | do. | \$3,500. | Steel. | \$40,000. |
| 10. Material of hull. | Wood. | Wood. | Wood. | Steel. | Do. |
| 11. Material of house. | do. | do. | do. | Wood; white pine. | Do. |
| 12. Contract cost. | \$16,465.83. | \$8,000. | \$8,000. | \$28,000. | No record. |
| 13. Cost of outfit. | \$431.75. | \$8,000. | \$8,000. | \$2,142. | Do. |
| 14. Present value. | \$14,000. | \$1,000. | \$800. | \$15,000. | \$96,000. |
| 15. Hull: | | | | | |
| (a) Length over all. | 78 feet 4 inches. | 65 feet. | 48 feet. | 120 feet. | 121 feet. |
| (b) Length on water line. | 71 feet 4 inches. | 62 feet. | 44 feet. | 119 feet 1 inch. | 113.2 feet. |
| (c) Beam over all. | 18 feet 9 inches. | 15 feet. | 13 feet 6 inches. | 24 feet. | 26 feet. |
| (d) Beam on water line. | 16 feet 10 inches. | 14 feet 11 inches. | 12 feet. | 22 feet. | 24 feet. |
| (e) Mollied depth amidship. | 7 feet 6 inches. | 8 feet. | 5 feet. | 4 feet 3 inches. | 13 feet 3 inches. |
| (f) Depth of keel outside of hull. | 5 inches. | 2 inches. | 5 inches. | None; flat bottom. | 6 inches. |
| (g) Draft forward. | 5 feet 4 inches. | 4 feet 9 inches. | 2 feet 6 inches. | 2 feet 2 inches. | 8 feet. |
| (h) Draft aft. | 7 feet. | 7 feet 6 inches. | 5 feet 6 inches. | 1 foot. | 12 feet. |
| (i) Displacement (long tons). | 95. | 46. | 29. | 122. | 294. |
| 16. Engines: | | | | | |
| (a) Number and type of propelling engines. | 1 fore-and-aft compound. | 1 noncondensing. | 1 single cylinder. | 2 quadruple expansion condensing. | 1 vertical fore and aft triple expansion. |
| (b) Dimensions of cylinders and stroke. | 11 and 22 inches by 14-inch stroke. | 12 by 14 inches. | 10 inches diameter by 9-inch stroke. | 7, 10, 14, and 20 inches diameter, 12-inch stroke. | 13 $\frac{1}{2}$, 21, and 33 $\frac{1}{2}$ by 24 inches. |
| (c) Revolutions per minute (average). | 165. | 160. | 190. | 240. | 125. |
| (d) Total horsepower. | 160. | 125. | 30. | 425. | 525. |
| 17. Propeller: | | | | | |
| (a) Diameter. | 5 feet 4 inches. | 5 feet. | 3 feet 10 inches. | Twin, 4 feet 3 inches each. | 8 feet 5 inches. |
| (b) Number of blades. | 4. | 4. | 4. | 4. | 4. |
| (c) Pitch. | 90 inches. | About 7 $\frac{1}{2}$ feet. | 4. | 5 feet 3 inches. | 10 feet 10 inches. |

TABLE XIV.—Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Post, J. C. | Quest. | Reese, General. | Rumsey, Jamaica. | See Laid. |
|---|--|--|----------------------------------|--|---------------------------------------|
| 18. Boilers: | | | | | |
| (a) Number and type..... | 1 Scotch marine..... | 1 firebox return tube..... | 1 Scotch marine..... | 1 Ward water-tube section coil..... | 1 Scotch marine. |
| (b) Dimensions..... | 7 feet 6 inches diameter by 10 feet long. | Length, 9 feet; diameter, 5 feet. | 6 feet by 3 feet 8 inches..... | Casing diameter, 88 inches; height, 9 feet from floor. | 12 feet 6 inches by 11 feet 6 inches. |
| (c) Number and diameter of tubes in one boiler..... | 98 of 3 inches diameter..... | 60 tubes, 2 inches diameter..... | 36 tubes, 2 inches diameter..... | 360 half-circle, 1.9 inches..... | 228, 3 inches. |
| (d) Heating surface..... | 750 square feet..... | 367 square feet..... | 1294 square feet..... | 1,655 square feet..... | 1,811 square feet. |
| (e) Grate surface..... | 1 furnace 45 inches diameter by 7 feet 9 inches long. ¹ | 19 square feet..... | 54 square feet..... | 53 square feet..... | 64.33 square feet. |
| (f) Steam pressure..... | 165 pounds..... | 125 pounds..... | 135 pounds..... | Average working, 200 pounds. | 180 pounds per square inch. |
| 19. Speed in miles per hour..... | 10..... | About 8..... | 8..... | Dredge, 2 dump boats, crane boat and flat, about 4 miles per hour in pool water. | 134. |
| 20. Towing capacity..... | 800 tons..... | Satisfactory for handling small derrick barge. | 100 tons..... | | 600 tons at 54 knots. |
| OPERATING COST. | | | | | |
| 21. Pay roll..... | \$2,912.83 | \$681.85 | \$4,020.00 | \$5,213.33 | \$8,887.01 |
| 22. Supplies: | | | | | |
| (a) Substances..... | (¹) | 299.67 | | | 3,401.74 |
| (b) Engine room..... | (¹) | 2.46 | 152.55 | 49.38 | 783.96 |
| (c) Boiler room..... | (¹) | | 213.00 | 277.69 | 68.01 |
| (d) Miscellaneous..... | 10.82 | 63.61 | 606.50 | 711.30 | 1,173.68 |
| 23. Coal..... | 1,173.46 | 127.80 | | | 4,005.62 |
| 24. Oil: | | | | | |
| (a) Kerosene..... | (¹) | 1.89 | 8.00 | 10.83 | 36.70 |
| (b) Lubricating..... | (¹) | 2.86 | 76.00 | 16.59 | 373.52 |
| 25. Water..... | | | | | 55.50 |
| 26. Ordinary repairs: | | | | | |
| (a) Hull..... | 104.43 | | 376.67 | 152.28 | 710.89 |
| (b) Machinery..... | 126.78 | | 96.60 | 16.76 | 795.74 |
| 27. Extraordinary repairs: | | | | | |
| (a) Hull..... | 621.46 | | | \$396.60 | 1,508.86 |
| (b) Machinery..... | | 12.64 | | | 3,108.78 |
| 28. Alterations and additions: | | | | | |
| (a) Hull..... | 150.00 | | | | 89.97 |
| (b) Machinery..... | | | | | 6.00 |

| | | | | | |
|---|---|---|--|---|--|
| 29. Laundry, ice, and miscellaneous expenses. | 16. 95 | 11. 42 | 186. 96 | 47. 40 | 614. 95 |
| 30. Office expenses. | (*) | 250. 00 | | 250. 00 | |
| 31. Total. | \$ 5,117. 72 | \$1,455. 19 | \$5,732. 28 | \$7,142. 24 | \$0.95 per barrel. ¹ |
| 32. Cost of coal per ton. | Fuel oil per barrel, \$0.75 and \$1.10. | \$3.50 | Kerosene, 8 cents; lard, 62 cents; cylinder, 43 cents. | \$1.02 (average) | Kerosene, 0.09 cents gallon in barrel; lubricating, 86 cents gallon in barrels. |
| 33. Cost of oil per gallon. | Lubricating, 40 cents. | | U. S. Engineer Department. | | |
| 34. By whom were repairs made. | Heiser & Under Machine Works, Portland, Ore. | | | | |
| 35. Number of days under steam. | 281 | 7. | 289. | 286. | |
| 36. Remarks on work done by tug during year. | Tender for pipe-line dredge Wahkiakum. | Used as a substitute for tug Spear and as tender for derrick barge. | Survey work, towing plant and cranes at South Pass, Mississippi River. | Employed as dredge tender, etc. | Miscellaneous towing and dredge tending. |
| | <i>Remarks.</i>
Operated on Columbia and lower Willamette Rivers, below Portland, Ore.
¹ Oil burner.
² Included in operating cost of pipe-line dredge Wahkiakum.
³ Fuel oil. | <i>Remarks.</i>
Operated at Combeault and Cleveland Harbors. This tug is spare plant and is put in commission only when needed to replace regular tender of dredge Maimee or when derrick barge is operated independently and at a distance from dredge. | | <i>Remarks.</i>
On Kanawha River, W. Va., as tender for dredge, delivering supplies, removing snags, and other minor work.
¹ Amount of repairs made by the United States.
² Amount of repairs made by the Kanawha Dock Co. | <i>Remarks.</i>
Tug acted as tender to the dredge Galveston. Miscellaneous towing in Galveston Harbor and channel, Houston ship channel and Texas City channel.
¹ Fuel oil. |

TABLE XIV.—Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| Name | Boat. | Scout. | Search. | Stars, Gen. C. B. | Seawater. |
|--|---|--|--|--|---|
| 1. District. | Detroit, Mich. | New York. | Detroit, Mich. (Lake Survey) | Duluth, Minn. | Baltimore, Md. |
| 2. Where built. | Ruffalo, N. Y. | Camden, N. J. | Ruffalo, N. Y. | Mustegon, Mich. | Do. |
| 3. When built. | 1888. | John H. Dialogue & Son. | 1896. | 1915-16. | Spring of 1887. |
| 4. Builder. | Not known. | 8 months. | Buffalo Dry Dock Co. | Reine-Truscott-Shell Lake Boat Co. | Spedden Ship Building Co. |
| 5. Time to build. | | | Unknown. | | 4 months. |
| 6. Where purchased. | Toledo, Ohio. | | New York, N. Y. | | |
| 7. When purchased. | 1901. | | 1899. | | |
| 8. From whom purchased. | James Rooney. | | Navy Department. | | |
| 9. Purchase price. | \$9,500. | | Unknown. | | |
| 10. Material of hull. | Wood. | | Steel. | | Steel. |
| 11. Material of house. | do. | | Wood. | | Wood. |
| 12. Contract cost. | | \$35,650. | Unknown. | \$75,508. | \$24,497 complete. |
| 13. Cost of outfit. | | \$11,000. | | \$91,000. | Included in above. |
| 14. Present value. | | | \$19,000. | | \$15,000. |
| 15. Hull: | | | | | |
| (a) Length over all. | 76.4 feet. | 108 feet 1 inch. | 133 feet 6 inches. | 110 feet 7 inches. | 95 feet. |
| (b) Length on water line. | 70.7 feet. | 98 feet. | 133 feet. | 102 feet 6 inches. | 95 feet 3 1/2 inches. |
| (c) Beam over all. | 18.4 feet. | 20 feet 10 inches. | 18 feet. | 22 feet. | 20 feet. |
| (d) Beam on water line. | 16.8 feet. | 20 feet. | 16 feet 9 inches. | do. | 18 feet 11 1/4 inches. |
| (e) Molded depth amidship. | 9.5 feet. | 10 feet 8 inches. | 10 feet. | 12 feet. | 10 feet 6 inches. |
| (f) Depth of keel outside of hull. | | 6 inches. | | 6 inches. | 6 inches. |
| (g) Draft forward. | 8.6 feet with 6 tons coal in bunkers. | 5 feet. | 6 feet. | 8 feet 6 inches. | 6 feet 6 inches. |
| (h) Draft aft. | 9.2 feet with 6 tons coal in bunkers. | 9 feet. | 7 feet 7 inches. | 10 feet. | 8 feet 6 inches. |
| (i) Displacement (long tons). | 59. | 195. | 200. | 280. | 170. |
| 16. Engines: | | | | | |
| (a) Number and type of propelling engines. | 1 noncondensing vertical. | 1 fore-and-aft compound. | 1 triple expansion. | 1 vertical 2-cylinder compound condensing. | 1 compound vertical. |
| (b) Dimensions of cylinders and strokes. | 20 1/2 inches diameter; 22-inch stroke. | High pressure, 14 inches; low pressure, 20 inches; 20-inch stroke. | 10 1/2, 17, and 27 inches; 16-inch stroke. | 16 and 32 inches, 24-inch stroke. | 11 1/2 and 20 1/2 inches; 20-inch stroke. |
| (c) Revolutions per minute (average). | 100. | 130. | 180-210. | 98. | 132. |
| (d) Total horsepower. | 180. | 300. | 600. | 800. | 860. |

| | | | | |
|---|--|---|---|---|
| 17. Propeller: | 6 feet 6 inches..... | 5 feet 3 inches..... | 8 feet..... | 6 feet 10 inches..... |
| (a) Diameter..... | 4..... | 4..... | 4..... | 4..... |
| (b) Number of blades..... | 9 feet..... | 4 feet 7 inches..... | 11 feet 9 inches straight pitch..... | 8 feet 7 inches..... |
| (c) Pitch..... | 1 Roberts water tube..... | 1 Moebius water-tube type A..... | One Scotch marine..... | 1 Scotch..... |
| 18. Boller: | 1 open-bottom marine, re-
turn flue..... | 8 feet 7 inches by 9 feet 10 1/2
inches..... | 12 feet diameter, 11 feet long..... | Diameter, 9 feet; length, 10
feet..... |
| (a) Number and type..... | 457, of 11, 13, and 2 inches..... | 1170; 1 1/2 inches..... | 108; 3 inches diameter, 8
feet long..... | 110; 3 1/2 inches..... |
| (b) Dimensions..... | 2,072 square feet..... | 1,710 square feet..... | 1,497 square feet..... | 876 square feet..... |
| (c) Number and di-
ameter of tubes
in one boiler..... | 58 square feet..... | 45 3/4 square feet..... | 50 1/2 square feet..... | 33 square feet..... |
| (d) Heating surface..... | 175 pounds..... | 225 pounds..... | 150 pounds..... | 150 pounds..... |
| (e) Grate surface..... | 12..... | 15..... | 12..... | 12 miles in smooth water..... |
| (f) Steam pressure..... | 1 vessel of 200 tons 8 miles
per hour..... | None..... | Ample for large scows or
dredge..... | 1,600 tons..... |
| 19. Speed in miles per hour..... | | | | |
| 20. Towing capacity..... | | | | |
| OPERATING COST. | | | | |
| 21. Pay roll..... | \$543.67 | \$6,972.71 | \$6,026.83 | \$6,455.66 |
| 22. Supplies: | | | | |
| (a) Subsistence..... | | | 1,250.12 | 2,245.00 |
| (b) Engine room..... | | 10.40 | 20.70 | 237.29 |
| (c) Boiler room..... | | 9.13 | 15.50 | 87.75 |
| (d) Miscellaneous..... | | 90.44 | 534.61 | 374.71 |
| 23. Coal..... | | 1,854.84 | 3,176.30 | 1,343.86 |
| 24. Oil: | | | | |
| (a) Kerosene..... | | 11.84 | 2.36 | 13.42 |
| (b) Lubricating..... | | 76.47 | 49.35 | 44.25 |
| 25. Water..... | | | | 88.29 |
| 26. Ordinary repairs: | | | | |
| (a) Hull..... | | 1,026.47 | 60.62 | 212.44 |
| (b) Machinery..... | | 218.34 | 103.38 | |
| 27. Extraordinary repairs: | | | | |
| (a) Hull..... | | 450.70 | 87.20 | 133.00 |
| (b) Machinery..... | | 149.04 | | 168.47 |
| 28. Alterations and addi-
tions: | | | | |
| (a) Hull..... | | | 283.25 | |
| (b) Machinery..... | | | 1,171.41 | |
| 29. Laundry, ice, and mis-
cellaneous expenses..... | | 168.36 | 240.18 | 473.71 |
| 30. Office expenses..... | | 1,103.97 | 1,298.55 | 350.00 |
| 31. Total..... | \$3,005.57 | \$2.87 | \$14,285.36 | \$12,207.85 |
| 32. Cost of coal per ton..... | \$6..... | \$14,812.84 | \$3.45 to \$6.35 and \$8.15 to
\$9.10..... | \$2.90 to \$3.25..... |
| 33. Cost of oil per gallon..... | | \$4.25 average..... | 6 cents to 50 cents..... | 10 1/2 to 18 cents for coal oil,
35 cents for lubricating..... |
| 34. By whom were repairs
made..... | Walker H. Oades, American
Boiler & Sheet Iron Works,
Detroit River Iron Works..... | Navy yard, New York..... | United States..... | (1). |

TABLE XIV.—Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending Dec. 31, 1916.

| Name..... | Sapper. | Scout. | Search. | Sears, Gen. C. B. | Sentinel. |
|--|--|--|--|--|---|
| OPERATING COST—contd. | | | | | |
| 35. Number of days under steam. | 49 (in Government service)..... | 265 (days of 24 hours)..... | 203..... | 365 ¹ | 355..... |
| 36. Remarks on work done by tug during year. | <p>Patrol duty.....</p> <p><i>Remarks.</i></p> <p>Harbor of Refuge, Harbor Beach, Mich.: from Aug. 16 to Sept. 20, 1916, rented to Wm. J. Meagher & Co., contractors, at \$150 per month (E. D. 948211); from Nov. 13 to Dec. 31, 1916, in Government service as attendant tug for use of custodian of harbor.</p> | <p>Patrol duty.....</p> <p><i>Remarks.</i></p> <p>Patrol duty New York Bay and Harbor, and seaward 6 miles outside Scotland Lightship.</p> | <p>Engaged on surveys, Lake Michigan.</p> <p><i>Remarks.</i></p> <p>Engaged on surveys, Lake Michigan.</p> | <p>Used for inspection and surveys; towing.²</p> <p><i>Remarks.</i></p> <p>1 240 days in service during navigation season; steam maintained in winter months.</p> <p>2 Timber, Duluth to Houghton; towing dredging plant from harbor to harbor.</p> | <p>(³).</p> <p><i>Remarks.</i></p> <p>1 Spedden Ship Building Co. and Calvert Machine Co. 2 General supervision of all works in the district, removal of wrecks; examinations and surveys; inspection of fishing structures and towing supplies to fortifications.</p> |

| Name..... | Specs. | Surveyor. | Speddy, C. | Tailor, Capt. | Thayer, Col. |
|--|---------------------------------|---------------------------------------|---|------------------------------|--------------------------------|
| 1. District..... | Cleveland, Ohio..... | Detroit, Mich. (Lake Survey) | Third, Mississippi River..... | Galveston, Tex..... | First, New York..... |
| 2. Where built..... | Huron, Ohio..... | South Haven, Mich..... | New Orleans, La..... | San Antonio, Miss..... | Rondout, N. Y..... |
| 3. When built..... | 1904..... | 1891..... | 1907..... | 1905..... | 1901..... |
| 4. Builder..... | U. S. Engineer Department..... | Unknown..... | Unknown..... | See Kimbal..... | Uister Davis et al..... |
| 5. Time to build..... | 1 year..... | do..... | do..... | No record..... | Unknown..... |
| 6. Where purchased..... | ..... | MacInnes, Mich..... | Greenville, Mich..... | Mobile, Ala..... | Albany, N. Y..... |
| 7. When purchased..... | ..... | Mar. 26, 1903..... | 1916..... | 1905..... | 1914..... |
| 8. From whom purchased..... | ..... | Geo. T. Arnold..... | Jas. M. Grasty..... | See Kimbal..... | Cornell Steamboat Co..... |
| 9. Purchase price..... | ..... | \$9,000..... | \$7,730..... | \$12,000..... | \$7,000..... |
| 10. Material of hull..... | Wood..... | Wood..... | Steel..... | Wood..... | Wood..... |
| 11. Material of house..... | do..... | do..... | do..... | do..... | Do..... |
| 12. Contract cost..... | \$10,500..... | Unknown..... | Unknown..... | No record..... | ..... |
| 13. Cost of outfit..... | \$10,500..... | do..... | do..... | do..... | ..... |
| 14. Present value..... | \$18,500..... | \$11,000..... | \$10,000..... | \$10,500..... | \$6,430..... |
| 15. Hull: | | | | | |
| (a) Length over all..... | 87 feet..... | 98 feet..... | 69 feet 5 inches..... | 80 feet..... | 61 feet..... |
| (b) Length on water line..... | About 80 feet..... | 91 feet 9 inches..... | 65 feet..... | 77 feet..... | 58 feet 7 inches..... |
| (c) Beam over all..... | 19 feet 8 inches..... | 20 feet 1 inch..... | 15 feet 3 inches..... | 17 feet..... | 16 feet 10 inches..... |
| (d) Beam on water line..... | do..... | 19 feet 6 inches..... | 14 feet..... | 16 feet 2 inches..... | 16 feet..... |
| (e) Molded depth amidship..... | 11 feet..... | 8 feet 5 inches..... | 8 feet..... | 8 feet..... | 6 feet 10 inches..... |
| (f) Depth of keel outside of hull..... | 4 inches..... | ..... | None..... | ..... | 7½ inches..... |
| (g) Draft forward..... | About 6 feet..... | 5 feet..... | 6 feet 6 inches..... | 7 feet..... | 5 feet..... |
| (h) Draft aft..... | 9 feet 6 inches..... | 8 feet 6 inches..... | 7 feet..... | 8 feet..... | 6 feet 5 inches..... |
| (i) Displacement (long tons)..... | 160..... | 176..... | 95..... | 43..... | 34..... |
| 16. Engines: | | | | | |
| (a) Number and type of propelling engines..... | 1 single, noncondensing..... | 1 steep compound condensing..... | 1 upright marine high pressure..... | 1 fore-and-aft compound..... | 1 vertical, noncondensing..... |
| (b) Dimensions of cylinders and stroke..... | 21½ inches; 22-inch stroke..... | 12 and 21 inches; 16-inch stroke..... | 12 inches diameter; 16-inch stroke..... | 12 and 22 by 18 inches..... | 14 by 15..... |
| (c) Revolutions per minute (average)..... | 125..... | 135..... | 125..... | 120..... | 125..... |
| (d) Total horsepower..... | 517..... | 150..... | 200..... | 185.59..... | 88..... |
| 17. Propeller: | | | | | |
| (a) Diameter..... | 7 feet 10 inches..... | 6 feet..... | 5 feet 10 inches..... | 6 feet 6 inches..... | 5 feet..... |
| (b) Number of blades..... | 4..... | 4..... | 4..... | 4..... | 4..... |
| (c) Pitch..... | 11½ feet..... | 8 feet..... | Unknown..... | 8 feet..... | 8 feet..... |

TABLE XIV.—*Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Specs. | Surveyor. | Sydney, C. | Tuljar, Capt. | Thayer, Col. |
|--|---|-----------------------------------|---|---------------------------------|-----------------------|
| 18. Boilers: | | | | | |
| (a) Number and type | 1 firebox, marine | 1 firebox, marine. | 1 Mississippi River return | 1 Scotch marine. | 1 leg. |
| (b) Dimensions..... | Length, 13 feet; diameter, 9 feet. | 11 feet long; 72 inches diameter. | 40 inches by 18 feet..... | 10 feet by 7 feet 8 inches..... | 10 feet by 66 inches. |
| (c) Number and diameter of tubes in boiler. | 128 tubes, 31 inches..... | 63; 31 inches. | Nine 6-inch..... | 86 feet 3 inches..... | 86; 2½ inches. |
| (d) Heating surface..... | 1,577 square feet. | 462 square feet..... | 380 square feet..... | 679 square feet..... | 470 square feet. |
| (e) Grate surface..... | 49 square feet..... | 21½ square feet..... | 28 square feet..... | 65 square feet..... | 21 square feet. |
| (f) Steam pressure..... | 150 pounds..... | 120 pounds..... | 188 pounds..... | 120 pounds per square inch..... | 150 pounds. |
| 19. Speed in miles per hour | 12 (about)..... | 9..... | 10..... | 8 to 10..... | 12. |
| 20. Towing capacity..... | Satisfactory for towing two 500 cubic-yard scows. | None..... | 500 tons upstream, 1,000 tons downstream. | | 300 tons (gross). |
| OPERATING COST. | | | | | |
| 21. Pay roll..... | \$5,063.07 | \$7,705.55 | \$868.00 | \$4,936.83 | \$4,661.10 |
| 22. Supplies: | | | | | |
| (a) Subistence..... | 966.31 | | 165.50 | 1,689.12 | 279.30 |
| (b) Engine room..... | 98.17 | 6.90 | 10.00 | 90.35 | 84.40 |
| (c) Boiler room..... | 6.00 | 1.20 | | 6.22 | 9.43 |
| (d) Miscellaneous..... | 80.23 | 78.53 | | 689.06 | 53.09 |
| 23. Coal..... | 1,636.00 | 976.62 | 254.40 | 1,774.82 | 1,224.02 |
| 24. Oil: | | | | | |
| (a) Kerosene..... | 5.75 | 13.90 | 2.50 | 25.37 | 6.30 |
| (b) Lubricating..... | 56.27 | 79.78 | 7.50 | 10.15 | 17.15 |
| 25. Water..... | | | | | 6.00 |
| 26. Ordinary repairs: | | | | | |
| (a) Hull..... | | | | | 72.59 |
| (b) Machinery..... | 7.68 | 730.07 | 132.91 | 49.03 | |
| 27. Extraordinary repairs: | | | | | |
| (a) Hull..... | | 241.14 | 450.54 | 58.33 | 4,616.16 |
| (b) Machinery..... | 14,831.64 | 31.92 | | | 705.90 |
| 28. Alterations and additions: | | | | | |
| (a) Hull..... | 40.72 | | 726.77 | | |
| (b) Machinery..... | 1,325.89 | | | | |
| 29. Laundry, fuel, and miscellaneous expenses..... | 134.13 | 343.23 | 5.00 | 81.38 | 635.90 |
| 30. Office expenses..... | 500.00 | 1,027.12 | | 127.56 | 20.87 |
| 31. Total..... | \$14,900.14 | \$11,268.29 | \$2,622.12 | \$8,918.82 | \$12,377.80 |

| | | | | | |
|--|---|---|---|--|---|
| 22. Cost of coal per ton..... | \$2.75 to \$3.50..... | \$3.41..... | \$3..... | \$0.95 per barrel 1..... | \$4.05..... |
| 23. Cost of oil per gallon..... | Kerosene, 9 to 12½ cents; lubricating, 35 to 44 cents. | Kerosene, 8.9 cents; lubricating, 38 cents. | 30 to 60 cents..... | Kerosene, 9 cents; lubricating, 66 cents (in barrels). | Kerosene, 12 cents; lubricating, 35 to 44 cents. |
| 34. By whom were repairs made. | Great Lakes Towing Co., Cleveland, Ohio. | United States Lake Survey. | U. S. Fleet at Vicksburg..... | | Athens Dry Dock, Athens, N. Y. |
| 35. Number of days under steam. | 222..... | 350..... | 92..... | | 308. |
| 36. Remarks on work done by tug during year. | Attendant tug to dredge Maumee.

1 Hull and house; boiler and machinery from unserviceable tug was installed. New boiler installed in 1915.
* The hull was thoroughly repaired and put in first-class condition. | See below.....

Engaged on surveys west end of Lake Erie. | (1).....

1 Tender to revetment party at Filers Bend, Miss., and at Vicksburg Harbor. | Dredge tending.....

Tended Miller, San Houston and San Jo into different times on Texas (fly channel, Houston Ship Channel, and Galveston Harbor; Fuel oil. | Tending dredges, miscellaneous towing.

Jan. 1 to Apr. 14 on Harlem River, N. Y. and East Chester, N. Y.; Apr. 15 to Nov. 26 on Upper Hudson River, N. Y.; Nov. 27 to Dec. 31 on James River, N. Y. and Manamora Harbor, N. Y. Double crew from Aug. 5 to Oct. 9. |

TABLE XIV.—Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Tug/av. | Tonly. | Totten, General. | Tunica. | Tucaloosa. |
|--|--|---------------------------------------|--------------------------------|--|-----------------------------------|
| 1. District..... | New Orleans (fourth Mississippi River) | New Orleans, La..... | First New York..... | New Orleans (fourth Mississippi River) | Mobile, Ala. |
| 2. Where built..... | Philadelphia, Pa..... | New York, N. Y..... | Long Island City, N. Y..... | Baltimore, Md..... | Pascagoula, Miss. |
| 3. When built..... | 1900..... | 1886..... | Unknown..... | 1894..... | 1908..... |
| 4. Builder..... | Neale & Levy..... | | | R. M. Speeden & Co..... | George R. Thompson. |
| 5. Time to build..... | Unknown..... | | | Unknown..... | 6 months. |
| 6. Where purchased..... | New York, N. Y..... | New York, N. Y..... | N. Y. City..... | Baltimore, Md..... | Mobile, Ala. |
| 7. When purchased..... | 1911..... | 1897 (rebuilt 1905) | 1913..... | 1898..... | 1908..... |
| 8. From whom purchased..... | Moran Towing Co..... | Mrs. Isabella Langston..... | James Flynn Co..... | Samuel Holmes..... | Lee Kimball. |
| 9. Purchase price..... | \$25,500..... | \$15,500..... | \$5,400..... | \$22,000..... | \$21,500. |
| 10. Material of hull..... | Steel..... | Wood..... | Wood..... | Steel..... | Wood, pine, and cypress. |
| 11. Material of house..... | do..... | | do..... | Included in purchase price. | Do. |
| 12. Contract cost..... | Included in purchase price. | | | Included in purchase price. | Included in purchase price. |
| 13. Cost of outfit..... | \$23,000..... | \$15,700..... | 16,915..... | \$15,000..... | \$16,000. |
| 14. Present value..... | | | | | |
| 15. Hull: | | | | | |
| (a) Length over all..... | 94 feet..... | 98 feet..... | 83 feet 7 inches..... | 90 feet..... | 92 feet. |
| (b) Length on water..... | 84 feet 6 inches..... | 91 feet..... | 88 feet..... | 88 feet 4 inches..... | 86 feet. |
| (c) Beam over all..... | 20 feet 4 inches..... | 16 feet..... | 17 feet 1 inch..... | 22 feet..... | 22 feet. |
| (d) Beam on water..... | 19 feet..... | do..... | 16 feet 4 inches..... | 20 feet 4 inches..... | 21 feet. |
| (e) Molded depth..... | 10 feet..... | 5 feet 6 inches..... | 6 feet 11 inches..... | 9 feet 8 inches..... | 8 feet. |
| (f) Depth of keel amidship..... | 4 inches..... | 6 inches..... | 7½ inches..... | 4 inches..... | 4 inches. |
| (g) Depth of keel outside of hull..... | 8 feet..... | 6 feet..... | 6 feet..... | 8 feet 1 inch..... | 5 feet 6 inches. |
| (h) Draft forward..... | 21 feet 6 inches..... | do..... | 7 feet 6 inches..... | 9 feet 7 inches..... | 8 feet 6 inches. |
| (i) Draft aft..... | 217..... | 120..... | 35..... | 216..... | 212. |
| (j) Displacement (long tons). | | | | | |
| 16. Engines: | | | | | |
| (a) Number and type of propelling engines..... | 1 fore-and-aft compound..... | 1 compound..... | 1 vertical, noncondensing..... | 1 steuple compound..... | 1 compound upright. |
| (b) Dimensions of cylinders and strokes..... | 15 inches and 30 by 22 inches..... | 10 and 22 inches, 12-inch stroke..... | 14 by 16..... | 13½ inches and 24 by 20 inches..... | 15 and 28 inches, 18-inch stroke. |
| (c) Revolutions per minute (average)..... | 136..... | 172..... | 130..... | 115..... | 120. |
| (d) Total horsepower..... | 800 nominal..... | 145..... | 97..... | 207 nominal..... | 228. |

| 17. Propeller: | | 7 feet 4 inches. | 4 feet 3 inches. | 6 feet. | 7 feet 2 inches. | 7 feet. |
|--|--|--|---|--|--|--------------------------------|
| (a) Diameter..... | | 4 | 4 | 4 | 4 | 4 |
| (b) Number of blades..... | | 11 feet. | 6 feet. | 4 | 10 feet 9 inches. | 8 feet. |
| (c) Pitch..... | | | | | | |
| 18. Boiler: | | | | | | |
| (a) Number and type..... | | 1 Scotch marine | 1 Almy water tube | 1 leg | 1 Scotch marine | 1 Scotch marine water back. |
| (b) Dimensions..... | | 11 feet 4 inches long, 11 feet diameter. | 5 feet 5½ inches long, 6 feet 3½ inches wide. | 11 feet by 58 inches. | 11 feet long, 10 feet diameter. | 11 by 9½ feet. |
| (c) Number and diameter of tubes..... | | 184, 3 inches. | 530 tubes 1½ inch diameter and 40 tubes 1½ inches diameter. | 96, 3 inches. | 126 of 3½ inches diameter. | 140 of 3 inches diameter. |
| (d) Heating surface..... | | 1,378 square feet. | 524 square feet. | 811 square feet. | 975 square feet. | 1,161 square feet. |
| (e) Grate surface..... | | 50 square feet. | 24.15 square feet. | 30 square feet. | 42 square feet. | 48 square feet. |
| (f) Steam pressure..... | | 150 pounds. | 150 pounds. | 100 pounds. | 150 pounds. | 140 pounds. |
| 19. Speed in miles per hour..... | | 11. | 11. | 10. | 13. | 10. |
| 20. Towing capacity..... | | 1,800 tons. | Unknown. | 400 tons (gross). | 1,500 tons upstream. | Dredge and accompanying plant. |
| OPERATING COST. | | | | | | |
| 21. Pay roll..... | | \$1,680.00 | \$4,442.68 | \$4,572.43 | \$3,926.61 | \$4,157.62 |
| 22. Supplies: | | | | | | |
| (a) Subsistence..... | | 435.98 | 2,104.74 | 889.64 | 861.74 | 907.36 |
| (b) Engine room..... | | 30.00 | 124.33 | 90.26 | 42.20 | 171.38 |
| (c) Boiler room..... | | 3.00 | 82.68 | 12.81 | | |
| (d) Miscellaneous..... | | | 906.90 | 222.06 | 18.10 | 356.34 |
| 23. Coal..... | | 1,580.00 | 1,120.75 | 1,866.46 | 3,164.95 | 1,161.65 |
| 24. Oil: | | | | | | |
| (a) Kerosene..... | | 5.00 | 18.83 | 8.09 | 19.35 | |
| (b) Lubricating..... | | 24.00 | 261.28 | 20.76 | 146.27 | 2.00 |
| 25. Water..... | | | 10.33 | 46.19 | | |
| 26. Ordinary repairs: | | | | | | |
| (a) Hull..... | | 1,385.00 | 124.60 | 6.00 | 825.00 | 124.88 |
| (b) Machinery..... | | 2,772.00 | 110.38 | 110.73 | 1,014.00 | 16.90 |
| 27. Extraordinary repairs: | | | | | | |
| (a) Hull..... | | | 505.00 | 2,741.80 | | 777.52 |
| (b) Machinery..... | | | 345.00 | 346.00 | | 28.68 |
| 28. Alterations and additions: | | | | | | |
| (a) Hull..... | | | 160.00 | | | |
| (b) Machinery..... | | | | 446.80 | | |
| 29. Laundry, ice and miscellaneous expenses..... | | 64.00 | 131.29 | 9.00 | 25.09 | 13.61 |
| 30. Office expenses..... | | | 291.92 | 65.00 | | |
| 31. Total..... | | \$7,871.93 | \$10,730.31 | \$11,455.84 | \$10,065.31 | \$7,707.94 |
| 32. Cost of coal per ton..... | | \$4.25 | \$4.50 | Average \$4.06 | \$4.50 | \$1.83 to \$2.13. |
| 33. Cost of oil per gallon..... | | 50 cents | \$1.70 | Kerosene, 12 cents; lubricating, 35 cents to 44 cents. | 12 cents for kerosene; 43 cents for lubricating. | No oil used as fuel. |

—Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Tick/sav. | Tonty. | Totten, General. | Tunka. | Tuscaloosa. |
|--|---|--|--|---|---|
| OPERATING COST—Contd. | | | | | |
| 34. By whom were repairs made..... | U. S. | United States (Navy Department). | Athens Dry Dock, Athens, N. Y. | Engineer depot..... | (1). |
| 35. Number of days under steam..... | 112..... | 132..... | 292..... | 296..... | 175. |
| 36. Remarks on work done by tug during year. | Excellent..... | See Remarks..... | Tending dredges, miscellaneous towing. | Towing plant and tender at sinking plant. | Tender for dredge. |
| | <i>Remarks.</i>
Operated only during September, October, November, and December at Passes and Grand Bay, towing rock and mattresses, and placing mattresses in position. | <i>Remarks.</i>
Used by Engineer officer in charge and assistants on inspection trips to Southern and Southwest Passes of the Mississippi River, Forts St. Philip and Jackson, Plaquemine, La., and occasionally for towing purposes. | <i>Remarks.</i>
Jan. 1 to May 12 on Matamoras Creek, N. J. Woodbridge Creek, N. J. Shond Harbor, N. Y., and Harlem River, N. Y.; May 13 to Dec. 31 on upper Hudson River, Bronx River, N. Y.; Dec. 11 to Dec. 31 on crew from May 28 to Oct. 9. | <i>Remarks.</i>
Between New Orleans and Vicksburg, Miss.; principally between Natchez and Vicksburg. | <i>Remarks.</i>
This boat acted as tender for dredge Pascagoula during the first 3 months engaged in work at Pascagoula and Gulfport, Miss., when plant was laid up. During the last 4 months it acted as tender for dredge Gulfport, at Gulfport, Miss. The total operating cost includes \$680.16 for storm damage due to hurricane of July 3, 1916.
U. S. shipyard, Pascagoula, Miss., assisted by crew of tug, Alabama Iron Works, Mobile, Ala.; A. Blumer, Moss Point, Miss. |

| Name..... | Ucha. | Vidette. | Vigilant. | Victor. | West Nebraska. |
|--|---------------------------------------|----------------------------|--|---|--|
| 1. District..... | New Orleans, La. | Philadelphia, Pa. | New York | Cleveland, Ohio. | Detroit, Mich. |
| 2. Where built..... | Philadelphia, Pa. | Baltimore, Md. | Elizabeth, N. J. | Detroit, Mich. | Sault Ste. Marie, Mich. |
| 3. When built..... | 1878. | 1888. | 1900. | 1892. | 1902. |
| 4. Builder..... | Unknown. | R. M. Spedden Co. | Lewis Nixon. | Detroit Shipbuilding Co. | Francis X. Payment. |
| 5. Time to build..... | do. | 10 months. | 9 months. | Unknown. | 54 months. |
| 6. Where purchased..... | Port Eads, La. | do. | do. | Sandusky, Ohio. | Sault Ste. Marie, Mich. |
| 7. When purchased..... | July, 1901. | do. | do. | 1897. | August, 1909. |
| 8. From whom purchased..... | Estate of James B. Eads. | do. | do. | Val. Doller, Jacob Hass, and Bulder. | do. |
| 9. Purchase price..... | \$10,000. | do. | do. | Wm. Frye. | \$7,668.50. |
| 10. Material of hull..... | Iron. | Steel. | Steel. | Steel. | Wood. |
| 11. Material of house..... | Wood. | Wood. | do. | Wood. | Do. |
| 12. Contract cost..... | \$35,100. | \$35,100. | do. | Unknown. | \$7,668.50. |
| 13. Cost of outfit..... | do. | Included in contract cost. | \$44,700. | do. | Included in price of vessel. |
| 14. Present value..... | \$6,250. | \$24,000. | \$20,000. | \$3,500 (sale price). | \$7,000. |
| 15. Hull: | | | | | |
| (a) Length over all..... | 62 feet. | 105 feet. | 114 feet 5½ inches. | 93 feet 6 inches. | 59 feet 6 inches. |
| (b) Length on water line..... | 56 feet. | 99 feet. | 110 feet 10 inches. | 80 feet 6 inches. | 53 feet 3 inches. |
| (c) Beam over all..... | 14 feet. | 21 feet. | 22 feet 8½ inches. | 20 feet (outside of fenders). | 15 feet 1 inch. |
| (d) Beam on water line..... | 12 feet. | do. | 22 feet. | 17 feet 9 inches. | 14 feet. |
| (e) Molded depth amidship..... | 7 feet 6 inches. | 10 feet. | 12 feet. | 6 feet 4 inches. | 6.5 feet. |
| (f) Depth of keel outside of hull..... | 6 inches. | 6 inches. | 6 inches. | 6 inches. | 3½ inches. |
| (g) Draught forward..... | 5 feet. | 6 feet 6 inches. | 9 feet 6 inches. | 4 feet 2 inches. | 4.5 feet (6 feet from bow). |
| (h) Draught aft..... | 7 feet 6 inches. | 10 feet. | 10 feet. | 7 feet 3 inches. | 6 feet. |
| (i) Displacement (long tons)..... | 43. | 900. | 208. | 145. | 47.4. |
| 16. Engines: | | | | | |
| (a) Number and type of propelling engines..... | 1 single cylinder. | 1 compound. | 1 triple expansion. | 1 triple expansion condensing. | 1 vertical single cylinder, high pressure. |
| (b) Dimensions of cylinders and stroke..... | 14 inches diameter by 16-inch stroke. | 14½ and 30 by 20 inches. | 12 by 18 by 30 inches; 18-inch stroke. | 9½, 14½, and 24 inches; 14-inch stroke. | 12 inches diameter, 12-inch stroke. |
| (c) Revolutions per minute (average)..... | 140. | 110. | 168. | 190. | 225. |
| (d) Total horsepower..... | 125. | 200. | 700. | 275. | 120. |
| 17. Propeller: | | | | | |
| (a) Diameter..... | 5 feet. | 7 feet 4½ inches. | 6 feet 9 inches. | 5 feet 2 inches. | 54 inches. |
| (b) Number of blades..... | 4. | 4. | 4. | 4. | 4. |
| (c) Pitch..... | About 7½ feet. | 11 feet 6½ inches. | 9 feet 6 inches. | 8 feet 6 inches. | 51 inches. |

—Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Tick/av. | Tonny. | Totten, General. | Tunica. | Tuscaloosa. |
|--|---|--|---|---|--|
| OPERATING COST—contd. | | | | | |
| 34. By whom were repairs made..... | U. S. | United States (Navy Department). | Athens Dry Dock, Athens, N. Y. | Engineer depot..... | (1). |
| 35. Number of days under steam..... | 112 | 137 | 292 | 296 | 175. |
| 36. Remarks on work done by tug during year. | Excellent. | See Remarks. | Tending dredges, miscellaneous towing. | Towing plant and tender at sinking plant. | Tender for dredge. |
| | Remarks.
Operated only during September, October, November, and December at Passes and Grand Bay, towing rock and mattresses, and placing mattresses in position. | Remarks.
Used by Engineer officer in charge and assistants on inspection trips to South and Southwest Passes of the Mississippi River, Forts St. Philip and Jackson and Plaquemine, La., and occasionally for towing purposes. | Remarks.
Jan. 1 to May 12 on Malachin Creek, N. Y.; Spoonbridge Creek, N. Y.; Stony Harbor, N. Y.; and Harlem River, N. Y.; May 13 to Dec. 10 on upper Hudson River, N. Y.; Dec. 10 to Dec. 31 on Bronx River, N. Y.; Doubled crew from May 28 to Oct. 9. | Remarks.
Between New Orleans and Vicksburg, Miss.; principally between Natchez and Vicksburg. | Remarks.
This boat acted as tender for dredge Pascagoula during the first 3 months engaged in work at Pascagoula and Gulfport, Miss., when plant was laid up. During the last 4 months it acted as tender for dredge Gulfport, at Gulfport, Miss. The total operating cost includes \$88,16 for storm damage due to hurricane of July 3, 1916.
U. S. shipyard, Pascagoula, Miss., assisted by crew of tug, Alabama Iron Works, Mobile, Ala.; A. Blumer, Moss Point, Miss. |

| Name..... | Uacha. | Vidette. | Vigilant. | Victor. | West Nebiah. |
|--|---------------------------------------|----------------------------|--|---|--|
| 1. District..... | New Orleans, La. | Philadelphia, Pa. | New York | Cleveland, Ohio. | Detroit, Mich. |
| 2. Where built..... | Philadelphia, Pa. | Baltimore, Md. | Elizabeth, N. J. | Detroit, Mich. | Sault Ste. Marie, Mich. |
| 3. When built..... | 1878. | 1888. | 1900. | 1882. | 1890. |
| 4. Builder..... | Unknown. | R. M. Spedden Co. | Lewis Nixon. | Detroit Shipbuilding Co. | Francis X. Payment. |
| 5. Time to build..... | do. | 10 months. | 9 months. | Unknown. | 54 months. |
| 6. Where purchased..... | Port Eads, La. | | | Sandusky, Ohio. | Sault Ste. Marie, Mich. |
| 7. When purchased..... | July, 1901. | | | 1887. | August, 1909. |
| 8. From whom purchased..... | Estate of James B. Eads. | | | Val. Deller, Jacob Hass, and Bulder. | |
| 9. Purchase price..... | \$10,000. | | | \$14,000. | \$7,683.50. |
| 10. Material of hull..... | Iron. | Steel. | Steel. | Steel. | W ood. |
| 11. Material of house..... | W ood. | W ood. | do. | W ood. | Do. |
| 12. Contract cost..... | \$35,100. | \$35,100. | do. | Unknown. | \$7,683.50. |
| 13. Cost of outfit..... | | Included in contract cost. | \$44,700. | do. | Included in price of vessel. |
| 14. Present value..... | \$6,250. | \$24,000. | \$20,000. | \$3,500 (sale price). | \$7,000. |
| 15. Hull: | | | | | |
| (a) Length over all..... | 82 feet. | 105 feet. | 114 feet 5½ inches. | 83 feet 6 inches. | 89 feet 6 inches. |
| (b) Length on water line..... | 56 feet. | 99 feet. | 110 feet 10 inches. | 83 feet 6 inches. | 53 feet 3 inches. |
| (c) Beam over all..... | 14 feet. | 21 feet. | 23 feet 8½ inches. | 20 feet (outside of fenders). | 15 feet 1 inch. |
| (d) Beam on water line..... | 12 feet. | do. | 22 feet. | 17 feet 9 inches. | 14 feet. |
| (e) Molded depth amidship..... | 7 feet 6 inches. | 10 feet. | 12 feet. | 6 feet 4 inches. | 6.5 feet. |
| (f) Depth of keel outside of hull..... | 6 inches. | 6 inches. | 6 inches. | 6 inches. | 3½ inches. |
| (g) Draft forward..... | 5 feet. | 6 feet 6 inches. | 9 feet 6 inches. | 4 feet 2 inches. | 4.5 feet (6 feet from bow). |
| (h) Draft aft..... | 7 feet 6 inches. | 10 feet. | 10 feet. | 7 feet 3 inches. | 6 feet. |
| (i) Displacement (long tons)..... | 43. | 200. | 208. | 145. | 47.4. |
| 16. Engines: | | | | | |
| (a) Number and type of propelling engines..... | 1 single cylinder. | 1 compound. | 1 triple expansion. | 1 triple expansion condensing. | 1 vertical single cylinder, high pressure. |
| (b) Dimensions of cylinders and stroke..... | 14 inches diameter by 16-inch stroke. | 14½ and 30 by 20 inches. | 12 by 18 by 30 inches; 18-inch stroke. | 9½, 14½, and 24 inches; 14-inch stroke. | 12 inches diameter, 12-inch stroke. |
| (c) Revolutions per minute (average)..... | 140. | 110. | 168. | 190. | 225. |
| (d) Total horsepower..... | 125. | 200. | 700. | 275. | 120. |
| 17. Propeller: | | | | | |
| (a) Diameter..... | 5 feet. | 7 feet 4½ inches. | 6 feet 9 inches. | 5 feet 2 inches. | 54 inches. |
| (b) Number of blades..... | 4. | 4. | 4. | 4. | 4. |
| (c) Pitch..... | About 7½ feet. | 11 feet 6½ inches. | 9 feet 6 inches. | 8 feet 6 inches. | 51 inches. |

TABLE XIV.—Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Tacha. | Victu. | Vigilant. | Visitor. | West Nebbish. |
|---|---|---|--|---|--|
| 18. Boilers:
(a) Number and type.....
(b) Dimensions.....
(c) Number and diameter of tubes in one boiler.....
(d) Heating surface.....
(e) Grate surface.....
(f) Steam pressure.....
19. Speed in miles per hour.....
20. Towing capacity..... | 1 return tube.....
10 feet 3 inches by 5 feet 6 1/2 inches.....
46 tubes, 3 inches diameter.....

298 square feet.....
17 square feet.....
12 pounds.....
10.....
450 tons..... | 1 Scotch tubular.....
10 feet 6 inches long; 11 feet 6 inches diameter.....
171, 3 inches.....

1,314 square feet.....
40.16 square feet.....
126 pounds.....
14.....
400 tons..... | 2 Badenhausen water tube.....
10 by 8 feet 6 inches by 7 feet 8 inches.....
340 of 2 inches diameter.....

1,500 square feet.....
6 by 6 feet each.....
196 pounds.....
12.....
Not adapted to towing..... | 1 McNaull water tube.....
Length 10 feet 6 inches; diameter 4 1/2 inches.....
83 tubes, 4 inches diameter.....

899 square feet.....
33 square feet.....
126 pounds.....
12 1/2.....
Not adapted to towing..... | 1 Scotch marine.....
6 feet diameter, 8 feet 5 inches high.....
93 of 2 1/2 inches diameter.....

445 square feet.....
16.5 square feet.....
140 pounds.....
10 1/2.....
Good..... |
| OPERATING COST. | | | | | |
| 21. Pay roll..... | \$4,630.00 | \$7,809.83 | \$8,715.50 | \$1,700.51 | ..... |
| 22. Supplies:
(a) Subsistence.....
(b) Engine room.....
(c) Boiler room.....
(d) Miscellaneous..... |
150.14
363.44
1,431.50 | 2,622.71
124.69
348.35
679.67
2,057.65 | 1,977.23
807.68
.....
3,780.39 | 342.55
6.64
3.10
82.76
218.40 |
.....
.....
.....
..... |
| 23. Coal..... | ..... | ..... | ..... | ..... | ..... |
| 24. Oil:
(a) Kerosene.....
(b) Lubricating..... | 8.00
225.32 | 19.68
70.72 | 170.25
132.00 | 10.60 | |
| 25. Water..... | ..... | ..... | ..... | ..... | ..... |
| 26. Ordinary repairs:
(a) Hull.....
(b) Machinery..... | 530.23
525.81 | 39.80
23.28 | 2,360.27 | 122.35
112.64 | \$46.65 |
| 27. Extraordinary repairs:
(a) Hull.....
(b) Machinery..... |
..... | 909.76
333.61 | | 133.82
182.00 | |
| 28. Alterations and additions:
(a) Hull.....
(b) Machinery..... |
..... |
24.39 | |
78.00 | |
| 29. Laundry, lace, and miscellaneous expenses..... | ..... | 223.33 | ..... | 36.27 | ..... |
| 30. Office expenses..... | 261.43 | 1,338.12 | ..... | 250.00 | ..... |
| 31. Total..... | \$6,015.87 | \$16,435.49 | \$17,973.32 | \$3,281.43 | \$46.65 |

| | | | | | |
|--|---|---|--|--|---------------------------------------|
| 32. Cost of coal per ton..... | \$3.50..... | Kerosene, 8 cents; lard, 62 cents; cylinder, 43 cents. | \$4.25 average..... | 53. Lubricating, 61.5 cents and 43.5 cents. | United States employees. |
| 33. Cost of oil per gallon..... | | | | | |
| 34. By whom were repairs made. | 4th Mississippi River district, Johnson Iron Works and N. O. Electric Welding Co. | | Navy yard, New York..... | Murphy Boiler Works, Cleveland, Ohio. | |
| 35. Number of days under steam. | 280..... | | 255..... | 55..... | |
| 36. Remarks on work done by tug during year. | Transport, moving plant, and survey work at South Pass, Mississippi River. | | Patrol duty..... | Used as inspection and survey boat. | |
| | | <i>Remarks.</i>
In Delaware River, above and below Philadelphia, Pa. | <i>Remarks.</i>
Patrol duty, New York Harbor, adjacent waters, and Long Island Sound. | <i>Remarks.</i>
Operated over the Cleveland, Ohio, district, Toledo to Cincinnati. This boat was condemned because unsuited to the needs of the Engineer Department, and was sold Aug. 5, 1915, to O. E. Dunbar, for \$5,500. | <i>Remarks.</i>
Not in commission. |

TABLE XIV.—Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued

| Name..... | White Water. | Wilson. | U. S. L. S. No. 1. | U. S. L. S. No. 2. |
|--|--|---------------------------------------|---|-------------------------------------|
| 1. District..... | Third Mississippi River..... | Seattle, Wash..... | Detroit, Mich. (Lake Survey)..... | Detroit, Mich. (Lake Survey). |
| 2. Where built..... | Camden, N. J..... | Detroit, Mich..... | Oakbrook, Wis..... | Detroit, Mich. |
| 3. When built..... | 1875..... | 1890..... | 1891..... | Rebuilt 1909. |
| 4. Builder..... | John Dialogue..... | Detroit Dry Dock Co..... | Unknown..... | United States Lake Survey. |
| 5. Time to build..... | Not known..... | 4 months..... | do..... | 3 years. |
| 6. Where purchased..... | New Orleans, La..... | ..... | Milwaukee, Wis..... | ..... |
| 7. When purchased..... | 1911..... | ..... | 1899..... | ..... |
| 8. From whom purchased..... | Whitman Bros..... | ..... | U. S. Engineer Office, Milwaukee district | ..... |
| 9. Purchase price..... | \$15,000..... | ..... | \$6,020.44..... | ..... |
| 10. Material of hull..... | Iron..... | Steel..... | Wood..... | Wood. |
| 11. Material of house..... | Wood..... | Wood..... | do..... | Do. |
| 12. Contract cost..... | Not known..... | \$7,000..... | Unknown..... | ..... |
| 13. Cost of outfit..... | do..... | ..... | do..... | ..... |
| 14. Present value..... | \$16,500..... | \$30,000..... | \$2,000..... | \$3,000. |
| 15. Hull: | | | | |
| (a) Length over all..... | 83 feet..... | 96 feet..... | 70 feet 1 inch..... | 70 feet 3 inches. |
| (b) Length on water line..... | 75 feet..... | 86 feet..... | 65 feet 6 inches..... | 60 feet 6 inches. |
| (c) Beam over all..... | 19 feet 8 inches..... | 19 feet 6 inches..... | 13 feet 6 inches..... | 14 feet 6 inches. |
| (d) Beam on water line..... | 18 feet 4 inches..... | do..... | 13 feet 3 inches..... | 14 feet 4 inches. |
| (e) Molded depth amidship..... | 9 feet..... | 11 feet..... | 6 feet 6 inches..... | 7 feet 6 inches. |
| (f) Depth of keel outside of hull..... | 4 inches..... | None..... | ..... | ..... |
| (g) Draft forward..... | 6 feet..... | 7 feet 3 inches..... | 3 feet 7 inches..... | 5 feet 3 inches. |
| (h) Draft aft..... | 8 feet 6 inches..... | 8 feet 3 inches..... | 5 feet 8 inches..... | 6 feet 6 inches. |
| (i) Displacement (long tons)..... | 145..... | 105..... | 56..... | 48. |
| 16. Engines: | | | | |
| (a) Number and type of propelling engines..... | 1 fore-and-aft compound condensing..... | 1 fore-and-aft compound..... | 1 single-cylinder noncondensing..... | 1 single-cylinder noncondensing. |
| (b) Dimensions of cylinders and stroke..... | 26 inches low pressure, 15 inches high pressure by 20-inch stroke..... | 15 and 30 inches, 20-inch stroke..... | 12 by 16 inches..... | 12 inches diameter, 14-inch stroke. |
| (c) Revolutions per minute (average)..... | 130..... | 125..... | 130..... | 175. |
| (d) Total horsepower..... | 275..... | 350..... | About 75..... | About 75. |
| 17. Propeller: | | | | |
| (a) Diameter..... | 7 feet 2 inches..... | 7 feet..... | 4½ feet..... | 4 feet. |
| (b) Number of blades..... | 4..... | 4..... | 4..... | 4. |
| (c) Pitch..... | 94 inches..... | 9 feet..... | 7 feet..... | 7 feet. |

FLOATING PLANT.

4433

| 18. Boilers: | | | 1 Scotch marine | | | 1 fire-box marine | | |
|---|---|----------------------------------|--|----------------------|-----------------------------|--------------------------------|--|----------------------------|
| (a) Number and type. | (b) Dimensions. | (c) Number and diameter of tubes | Diameter, 10 feet 6 inches | 10 feet 5 1/2 inches | 10 feet by 4 feet 9 inches. | 10 feet long, 5 feet diameter. | | |
| (c) In one boiler. | 188; 3 inches diameter. | 1,054 square feet. | 150; 3 inch. | 150; 3 inch. | 58; 3 inches diameter. | 58; 3-inch tubes. | | |
| (d) Heating surface. | 1,054 square feet. | 24 square feet. | 40 feet. | 40 feet. | 410 square feet. | 465 square feet. | | |
| (e) Grate surface. | 150 pounds. | 12 pounds. | 125 pounds. | 125 pounds. | 17 square feet. | 16 square feet. | | |
| (f) Steam pressure. | 12. | 12. | 10. | 10. | 85 pounds. | 125 pounds. | | |
| 19. Speed in miles per hour. | 500 tons upstream, 1,000 tons downstream. | | Uncertain. | Uncertain. | 8. | 8. | | |
| 20. Towing capacity. | | | | | Good for size of boat. | None. | | |
| OPERATING COST. | | | | | | | | |
| 21. Pay roll. | \$2,452.15 | | \$5,501.58 | | | | | |
| 22. Supplies: | | | | | | | | |
| (a) Substances. | 440.96 | | 1,126.26 | | | | | |
| (b) Engine room. | 28.80 | | 42.62 | | | | | \$1.38 |
| (c) Boiler room. | | | 47.96 | | | | | |
| (d) Miscellaneous. | 42.15 | | 319.18 | | | | | |
| 23. Coal. | 1,071.84 | | 1,80.76 | | | | | |
| 24. Oil. | | | | | | | | |
| (a) Kerosene. | 5.00 | | 4.96 | | | | | |
| (b) Lubricating. | 14.56 | | 48.28 | | | | | |
| 25. Water. | | | 17.68 | | | | | |
| 26. Ordinary repairs. | | | | | | | | |
| (a) Hull. | 288.11 | | 213.33 | | | | | 120.23 |
| (b) Machinery. | 291.63 | | 74.74 | | | | | |
| 27. Extraordinary repairs: | | | | | | | | |
| (a) Hull. | | | | | | | | |
| (b) Machinery. | | | 824.00 | | | | | 30.80 |
| 28. Alterations and additions: | | | 2,983.00 | | | | | |
| (a) Hull. | | | | | | | | |
| (b) Machinery. | | | | | | | | |
| 29. Laundry, ice, and miscellaneous expenses. | 22.80 | | 102.62 | | | | | |
| 30. Office expenses. | | | 800.00 | | | | | 15.24 |
| 31. Total. | | | | \$14,604.52 | | | | \$167.68 |
| 32. Cost of coal per ton. | \$2.90 | | 2.4 cents, 2.7 cents, 2.8 cents, 3 cents, 3.3 cents, 3.5 cents, 4.7 cents. | | | | | |
| Cost of oil per gallon. | 30 to 60 cents. | | 84 cents, 48 cents, 49 cents. | | | | | |
| By whom were repairs made. | United States fleet at Vicksburg. | | Masters Shipbuilding Co. and hired labor. | | | | | United States Lake Survey. |

TABLE XIV.—Report of operations of tug and survey boats (screw—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | White Water. | Wilson. | U. S. L. S. No. 1. | U. S. L. S. No. 2. |
|--|--|---|---|---|
| OPERATING COST—continued. | | | | |
| 35. Number of days under steam..... | 245..... | 155..... | | |
| 36. Remarks on work done by tug during year. | <p><i>Remarks.</i></p> <p>1 Tender to revatment works at Greenville Harbor and Coltonwood, Miss.</p> | <p><i>Remarks.</i></p> <p>1 Fuel oil, \$3,017.60.
2 Towing sand and gravel for Lake Washington Canal locks.
3 Surveying Grays Harbor Bar, Wash.
4 Towing scow and survey party to Dry Straits, Alaska, and return.
5 Inspecting fish traps in Alaskan waters.
6 Towing barge of material and supplies to anchorage, Alaska, for Alaskan Engineering Commission.
7 Vessel in commission from Apr. 17, 1916, to Sept. 22, 1916.</p> | <p><i>Remarks.</i></p> <p>Not in commission because of lack of funds.</p> | <p><i>Remarks.</i></p> <p>Not in commission because of lack of funds.</p> |

TABLE XV.

STEAM LIGHTERS.

4435

TABLE XV.—*Report of operations of steam lighters for the calendar year ending Dec. 31, 1916.*

| 1. Name, letter, or number..... | Executive. |
|--|---|
| 2. District..... | Boston, Mass. |
| 3. Where built..... | Essex, Mass. |
| 4. When built..... | 1901. |
| 5. Builder..... | Arthur D. Story. |
| 6. Time to build..... | 8 months. |
| 7. Where purchased..... | |
| 8. When purchased..... | |
| 9. From whom purchased..... | |
| 10. Purchase price..... | |
| 11. Material of hull..... | Wood. |
| 12. Material of house..... | Do. |
| 13. Contract cost..... | \$19,450. |
| 14. Cost of outfit..... | Unknown; came with boat. |
| 15. Present value..... | \$6,000. |
| 16. Hull: | |
| (a) Length over all..... | 91 feet. |
| (b) Length on water line..... | 83 feet. |
| (c) Beam over all..... | 20 feet. |
| (d) Beam on water line..... | 20 feet. |
| (e) Molded depth amidship..... | 10 feet. |
| (f) Draft forward..... | 8 feet. |
| (g) Draft aft..... | 9 feet 4 inches. |
| (h) Displacement (long tons)..... | 236. |
| 17. Engines: | |
| (a) Number and type of propelling engines..... | 1 fore and aft compound. |
| (b) Dimensions of cylinders and strokes..... | 11½ and 24 inches, 16-inch stroke. |
| (c) Revolutions per minute (average)..... | 150. |
| (d) Total horsepower..... | 235. |
| 18. Propeller: | |
| (a) Diameter..... | 5 feet 9 inches. |
| (b) Number of blades..... | 4. |
| (c) Pitch..... | 8 feet. |
| 19. Boilers: | |
| (a) Number and type..... | 1 Almy water tube. |
| (b) Dimensions..... | 8 feet 7 inches diameter, 5 feet 9 inches long. |
| (c) Heating surface (total)..... | 1,226 square feet. |
| (d) Grate surface (total)..... | 32 square feet. |
| (e) Working steam pressure..... | 180 pounds. |
| 20. Cargo capacity..... | 25 tons, all on deck. |
| 21. Capacity of derrick..... | 4 tons. |
| 22. Dimensions of hoisting engines..... | 7 by 10 double cylinder. |
| 23. Speed in miles per hour..... | 10. |
| 24. Towing capacity..... | 3 tons static pull. |
| 25. Number of men in crew..... | 5. |
| OPERATING COST. | |
| 26. Pay roll..... | \$4,673.84 |
| 27. Subsistence..... | |
| 28. Supplies: | |
| (a) Engine room..... | 127.42 |
| (b) Boiler room..... | 292.04 |
| (c) Miscellaneous..... | 146.88 |
| 29. Coal..... | 2,519.32 |
| 30. Oil: | |
| (a) Kerosene..... | |
| (b) Lubricating..... | 82.86 |
| 31. Water..... | 11.67 |
| 32. Ordinary repairs: | |
| (a) Hull..... | 1,067.78 |
| (b) Machinery..... | 451.98 |
| 33. Extraordinary repairs: | |
| (a) Hull..... | |
| (b) Machinery..... | |

4438 REPORT OF CHIEF OF ENGINEERS, U. S. ARMY, 1917.

TABLE XV.—*Report of operations of steam lighters for the calendar year ending Dec. 31, 1916—Continued.*

| 1. Name, letter, or number..... | <i>Executive.</i> |
|---|---|
| OPERATING COST—continued. | |
| 34. Alterations and additions: | |
| (a) Hull..... | \$475.53 |
| (b) Machinery..... | ..... |
| 35. Laundry, ice, and miscellaneous expenses..... | ..... |
| 36. Office expenses..... | ..... |
| 37. Total..... | 9,849.27 |
| 38. Cost of coal per short ton..... | \$4.20 to \$5.50. |
| 39. Cost of oil per gallon..... | 22 to 34 cents. |
| 40. By whom and where repairs were made..... | (1). |
| 41. Remarks on work done during year..... | (2). |
| | <p data-bbox="777 539 852 556"><i>Remarks.</i></p> <p data-bbox="628 572 1000 618">¹ By hired labor; Bertelsen & Petersen Engineering Co.; and Ambrose A. Martin; all at East Boston, Mass.</p> <p data-bbox="628 618 1000 685">² The boat was operated in Boston Harbor, Mass., and vicinity tending survey parties, etc., and carrying supplies for fortification and seawall construction.</p> |

TABLE XVI.

**TOW AND SURVEY BOATS (STEAM—PADDLE
ONLY).**

4439

TABLE XVI.—Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916.

| 1. Name..... | Ada. | Alabama. | Alert. | Allen, A. D. | Augusta, Lieutenant. |
|--|----------------------------------|--|--------------------|--------------------------------------|--|
| 2. District..... | Rock Island. | Montgomery, Ala. | Rock Island. | Little Rock, Ark. | Kansas City, Mo. |
| 3. Where built..... | Keokuk, Iowa. | Marietta, Ohio. | Stullwater, Minn. | Hull at Blueville, Ark. | Dubuque, Iowa. |
| 4. When built..... | 1886. | 1886. | 1874. | Rebuilt 1914. | 1911. |
| 5. Builder..... | United States. | Marietta Manufacturing Co. | Not known. | U. S. Engineers. | Dubuque Boat & Boiler Works. |
| 6. Time to build..... | 9 months. | Not known. | No record. | 7 months. | 10 months. |
| 7. Where purchased..... | | Louisville, Ky. | Stullwater, Minn. | | Dubuque, Iowa. |
| 8. When purchased..... | | 1886. | 1881. | | 1911. |
| 9. From whom purchased..... | | | St. Croix Boom Co. | | Dubuque Boat & Boiler Works. |
| 10. Purchase price..... | | \$15,000. | \$9,000. | | |
| 11. Material of hull..... | Wood. | Wood. | Wood. | Crescent oak and pine. | Steel. |
| 12. Material of hull..... | do. | do. | do. | Pine. | Wood. |
| 13. Contract cost..... | \$4,000. | Not known. | | \$7,500. | \$24,888.70. |
| 14. Cost of outfit..... | Included in above. | Included under purchase price. | | \$1,580. | \$1,066.38. |
| 15. Present value..... | \$2,204.61. | \$26,500. | \$5,987.46. | \$7,500. | \$24,224. |
| 16. Hull: | | | | | |
| (a) Length over all..... | 76 feet. | 156 feet 5 inches. | 120 feet. | 137 feet 10 inches. | 136 feet. |
| (b) Length on water line..... | 64 feet. | 131 feet. | 110 feet. | 111 feet 8 inches. | 114 feet 6 inches. |
| (c) Length of hull..... | 66 feet. | 135 feet 5 inches. | 114 feet. | 119 feet 4 inches. | 116 feet. |
| (d) Beam over all..... | 18 feet. | 20 feet 4 inches. | 22 feet 9 inches. | 22 feet 6 inches. | 22 feet 6 inches. |
| (e) Beam on water line..... | 12 feet. | 20 feet 6 inches. | 19 feet 6 inches. | 22 feet 5 inches. | 22 feet 4 inches. |
| (f) Molded depth amidship..... | 3 feet. | 4 feet 4 inches. | 3 feet 10 inches. | 4 inches. | 5 feet. |
| (g) Draught forward..... | 1 foot 11 inches. | 2 feet 6 inches. | 2 feet 5 inches. | 2 feet 11 inches. | 3 feet 10 inches. |
| (h) Draught aft..... | 1 foot 11 inches. | 2 feet 6 inches. | 2 feet 8 inches. | 2 feet. | 3 feet 31 inches. |
| (i) Displacement (long tons)..... | 26 (approximate). | 219. | 135. | 180. | 191. |
| 17. Engines: | | | | | |
| (a) Number and type of propelling engines..... | 2 lever. | 2 tandem, noncondensing compound. | 2 lever. | 2 Western River, California cut-off. | 2 cross-compound. |
| (b) Diameter and stroke..... | 6-inch diameter, 49-inch stroke. | 10 inches high, 17½ inch low pressure 5-foot stroke. | 10 by 60 inches. | 10 inches diameter, 4-foot stroke. | High pressure, 13 inches; low pressure, 26 inches; 5 feet. |
| (c) Revolutions per minute, light..... | 40. | 25. | 30. | 26. | 25. |
| (d) Revolutions per minute, towing..... | 36. | 18 to 20. | 20. | 20. | 19. |
| 18. Paddle wheel: | | | | | |
| (a) Diameter..... | 9 feet. | 15 feet. | 14 feet 4 inches. | 14 feet 2 inches. | 16 feet. |
| (b) Number of buckets..... | 9. | 14. | 13. | 14. | 12. |

| (c) Length and width of bunkers. | 9 feet by 15 inches. | 13 feet long, 24 inches wide. | 13 feet by 24 inches. | 15 feet, 6 inches by 23 inches. | 15 feet 2 inches by 24 inches. |
|--|------------------------|-------------------------------|-----------------------------------|---------------------------------|--------------------------------|
| | 4 inches. | 7 1/2 inches (hexagon). | 6 inches. | 6 inches. | 7 1/2 inches. |
| (d) Diameter of shaft. | 3. | 4. | 4. | 4. | 4. |
| (e) Number of wheel langes. | 1, horizontal tubular. | 3 western river steamboat. | 1 1/2 fine Mississippi River. | 1 1/2 fine Mississippi River. | 2 Mississippi River. |
| (f) Number and type. | 10 feet by 36 inches. | 30 inches by 20 feet long. | 42 inches by 21 feet 10 inches. | 44 inches by 20 feet long. | 43 inches by 20 feet. |
| (g) Dimensions. | 26 of 3-inch diameter. | 2 of 11-inch diameter. | 10 21 feet 10 inches by 6 inches. | 2 12-inch and 3 10-inch. | 10, 6 inches. |
| (h) Number and diameter of flues in one boiler. | 271 square feet. | 644 square feet. | 479 square feet. | 436 square feet. | 930 square feet. |
| (i) Total heating surface. | 164 square feet. | 51 square feet. | 16 square feet. | 22 1/2 square feet. | 92 square feet. |
| (j) Total grate surface. | 165 pounds. | 220 pounds. | 160 pounds. | 171 pounds per square inch. | 130 pounds. |
| (k) Steam pressure. | 9. | 10. | 9 1/2. | 7 miles. | 9. |
| (l) Speed in miles per hour (average of up and down stream speed). | 130 tons. | 8 loaded barges. | 6 loaded barges. | Three 200-ton scows. | 5 barges, 625 tons cargo. |
| (m) Towing capacity. | 6. | 13. | 9. | 6. | 9. |
| (n) Number of men in crew. | | | | | |
| OPERATING COST. | | | | | |
| 22. Pay roll. | \$1,018.50 | \$4,114.68 | \$1,618.51 | \$762.31 | \$4,482.99 |
| 23. Subsistence. | 208.00 | 1,241.83 | 431.83 | 269.83 | 1,335.33 |
| 24. Supplies: | | | | | |
| (a) Engine room. | 32.75 | 32.37 | | 85.05 | 12.16 |
| (b) Boiler room. | 7.46 | 6.21 | | 93.96 | 1.76 |
| (c) Miscellaneous. | 200.02 | 235.09 | 14.15 | 13.40 | 113.46 |
| 25. Coal. | | 1,836.00 | 682.50 | 697.46 | 3,496.38 |
| 26. Oil: | | | | | |
| (a) Kerosene. | 2.59 | 8.35 | 5.34 | 21.89 | 11.91 |
| (b) Lubricating. | 9.94 | 35.33 | 14.76 | 37.26 | 90.41 |
| 27. Ordinary repairs: | | | | | |
| (a) Hull. | 315.51 | 918.29 | 363.23 | 85.46 | 433.65 |
| (b) Machinery. | 61.06 | 1,108.56 | 194.01 | 117.16 | 14.34 |
| 28. Extraordinary repairs: | | | | | |
| (a) Hull. | | | | | |
| (b) Machinery. | | | | | |
| 29. Alterations and additions: | | | | | |
| (a) Hull. | | | | 128.10 | |
| (b) Machinery. | | | | | |
| 30. Laundry, ice, and miscellaneous expenses. | | | | | |
| (a) Hull. | 664.21 | 664.21 | | | 664.21 |
| (b) Machinery. | 77.50 | 155.85 | | | 66.79 |
| 31. Laundry, ice, and miscellaneous expenses. | 37.10 | 46.70 | 157.13 | 397.06 | |
| 32. Office expenses. | 150.00 | 1,046.52 | 300.00 | 128.95 | 328.09 |
| 33. Total. | \$2,275.44 | \$11,511.08 | \$3,962.44 | \$2,707.87 | \$11,264.48 |

TABLE XVI.—Report of operations of tug and survey boats (paddle-steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Ada. | Alabama. | Alert. | Allen, A. D. | Augustin, Lieutenant. |
|--|---|---|---|---|--|
| OPERATING COST—contd. | | | | | |
| 34. Cost of coal per long ton. | \$3.87..... | \$2.61..... | \$3.87..... | \$2.76+..... | \$3.07 (average). |
| 35. Cost of oil per gallon. | Kerosene, 7.4 cents; lubricating, 9 to 36 cents. | \$0.30..... | Kerosene, 7.4 cents; lubricating, 9 to 36 cents. | Kerosene, 10 cents; lubricating, 33¢ and 28 cents. | 30 cents. |
| 36. By whom and when repairs were made. | United States, 1916..... | U. S. Engineer Department. | United States, 1916..... | U. S. Engineers..... | United States, during working season. |
| 37. Days under steam. | 85..... | 95..... | 94..... | 133 days..... | 238. |
| 38. Remarks on work done by towboat during year. | Towing materials for river improvement. | Tender to U. S. dredge Petrus and general towing. | Towing materials for river improvement. | See remarks. | General towing of materials and plant for improvement works. |
| | <i>Remarks.</i>
In subdivision St. Paul to Winona. | <i>Remarks.</i>
This plant was operated between Montgomery, Ala., and Selma, Ala., on the Alabama River. One trip was made from Montgomery, Ala., to Mobile, Ala., and return and one trip from Selma, Ala., to Tuscaloosa, Ala., and return with tow of coal. | <i>Remarks.</i>
In subdivision St. Paul to Winona. | <i>Remarks.</i>
Intermittent general services in connection with maintenance of locks and dams in upper White River.
Rebuilding cost plus value of machinery and upper works transferred from old hull. | <i>Remarks.</i>
Operation on Missouri River (Kansas City to mouth). |

FLOATING PLANT.

4443

| 1. Name. | Asa Vase. | Bonessilla. | Boone, Daniel. | Caryaga. | Chalmers. |
|--|-----------------------------------|--------------------------------------|------------------------------------|--------------------------------------|--|
| 2. District. | St. Louis, Mo. | Kansas City, Mo. | Kansas City, Mo. | First, Cincinnati, Ohio. | New Orleans (fourth Missis- |
| 3. Where built. | Jaffersonville, Ind. | St. Louis Harbor, S. Dak. | Gassonade, Mo. | Cincinnati, Ohio. | issippi River. |
| 4. When built. | 1894. | 1913. | 1913. | 1913-14. | Jaffersonville, Ind. |
| 5. Builder. | M. A. Sweeney Co. | United States. | United States. | The Charles Barnes Co. | 1913. |
| 6. Line to build. | 11 months. | 7 months. | 8 months. | 12 months. | Ed. J. Howard. |
| 7. Where purchased. | | | | | 20 days. |
| 8. When purchased. | | | | | Jaffersonville, Ind. |
| 9. From whom purchased | | | | | B. contract. |
| 10. Purchase price. | | | | | entered into |
| 11. Material of hull. | Wood. | Wood. | Wood. | Steel. | Sept. 25, 1914. |
| 12. Material of house. | do. | do. | do. | Wood. | Ed. J. Howard. |
| 13. Contract cost. | \$4,400. | \$17,453.80 (actual cost). | \$12,103.40. | \$24,980.50. | \$16,425. |
| 14. Cost of outfit. | \$330. | \$1,117.90. | \$1,000. | \$3,463.16. | Wood. |
| 15. Present value. | | \$12,702.52. | \$6,900. | \$45,691.90. | \$78,743. |
| 16. Hull: | | | | | \$16,000. |
| (a) Length over all. | 84 feet 8 inches. | 127 feet 8 inches. | 117 feet 6 inches. | 168.8 feet. | 105 feet. |
| (b) Length on water | 70 feet. | 106 feet 6 inches. | 96 feet. | 138.6 feet. | 103 feet. |
| (c) Length of hull. | 71 feet. | 110 feet. | 100 feet. | 142 feet. | 89 feet. |
| (d) Beam over all. | 13 feet 6 inches. | 22 feet 9 inches. | 22 feet 7 inches. | 31.06 feet. | 22 feet 6 inches. |
| (e) Beam on water | 13 feet. | 21 feet 6 inches. | 21 feet 8 inches. | 30 feet. | 18 feet 3 inches. |
| (f) Molded depth | 3 feet 6 inches. | 4 feet. | 4 feet. | 4.25 feet. | 5 feet 1 inch. |
| (g) Draft forward. | 2 feet 2 inches. | 1 foot 4 inches. | 1 foot 5 inches. | 2 feet 6 inches. | 2 feet 7 inches. |
| (h) Draft aft. | 2 feet 2 inches. | 1 foot 10 inches. | 2 feet. | 2 feet 5 inches. | 2 feet 6 inches. |
| (i) Displacement | 50. | 93. | 86. | 264.3. | 132 tons. |
| (j) Displacement (long tons). | | | | | |
| 17. Engines: | | | | | |
| (a) Number and type of propelling engines. | 2 Gillett & Eaton. | 2 high pressure, lever poppet valve. | 2 high pressure. | 2 noncondensing, California cut-off. | 2 tandem compound condensing. |
| (b) Diameter and stroke. | 8 inches diameter, 4-foot stroke. | 8 inches by 5 feet. | 9 inches diameter, 64-inch stroke. | 15 inches by 72 inches. | 7 and 15 inches; length of stroke 46 inches. |
| (c) Revolutions per minute light. | 30. | 25. | 29. | 28. | 22. |
| (d) Revolutions per minute towing. | 25. | 15. | 24. | 23. | 17. |

TABLE XVI.—*Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.*

| 1. Name..... | Aux Vess. | Bonneville. | Boone, Daniel. | Cayuga. | Chalmers. |
|--|--|---------------------------|--|--|--|
| 18. Paddle wheel: | | | | | |
| (a) Diameter..... | 10 feet..... | 13 feet 8 inches..... | 14 feet..... | 10.5 feet..... | 13 feet..... |
| (b) Number of buckets..... | 10..... | 14..... | 13..... | 14..... | 13..... |
| (c) Length and width of buckets..... | 10 feet long, 20 inches wide..... | 13 feet by 20 inches..... | 13 feet 6 inches by 20 inches..... | 19.5 feet by 2.5 feet..... | 13 feet 6 inches by 1 foot 8 inches..... |
| (d) Diameter of shaft..... | 5½ inches..... | 5 inches..... | 5 inches..... | (Hexagon) 8.5 inches least diameter..... | 6½ inches..... |
| (e) Number of wheel flanges..... | 3..... | 3..... | 4..... | 5..... | 4 inches..... |
| 19. Boiler: | | | | | |
| (a) Number and type..... | 1 Mississippi River..... | 1 Scotch marine..... | 1 Scotch marine..... | 3 Mississippi River..... | 2 Mississippi River type..... |
| (b) Dimensions..... | 42 inches diameter, 13½ feet long..... | 14 by 5 feet..... | 60 inches inside diameter, 12 feet long..... | 40 inches diameter, 24 feet long..... | 38 inches diameter, 9 feet 6 inches long..... |
| (c) Number and diameter of flues in one boiler..... | Four 9½-inch..... | Fifty-two 3-inch..... | Fifty-two 3-inch..... | Four 6-inch and two 10-inch..... | 21 tubes 3 inches diameter, 2 ½ inches diameter..... |
| (d) Total heating surface..... | 240 square feet..... | 650 square feet..... | 584 square feet..... | 1,337 square feet..... | 494.92 square feet..... |
| (e) Total grate surface..... | 20 square feet..... | 15 square feet..... | 15.4 square feet..... | 50 square feet..... | 20.75 square feet..... |
| (f) Steam pressure..... | 150 pounds..... | 200 pounds..... | 200 pounds..... | 200 pounds..... | 212.8 pounds per square inch..... |
| 20. Speed in miles per hour (average of up and down stream speed)..... | 6..... | 9..... | 9..... | 14 miles, running light..... | 8 miles..... |
| 21. Towing capacity..... | 400 tons..... | 300 long tons..... | 400 long tons (upstream)..... | 9..... | 900 tons upstream..... |
| 22. Number of men in crew..... | 5..... | 8..... | 9..... | 9..... | 7..... |
| OPERATING COST. | | | | | |
| 23. Pay roll..... | \$730.00..... | \$4,323.65..... | \$3,762.17..... | \$4,449.07..... | \$2,097.52..... |
| 24. Subsistence..... | 220.74..... | 1,177.93..... | 1,305.80..... | 1,283.10..... | \$67,500.37..... |
| 25. Supplies: | | | | | |
| (a) Engine room..... | 8.00..... | 85.67..... | 67.65..... | 619.90..... | 27.00..... |
| (b) Boiler room..... | 5.00..... | 2.73..... | 23.07..... | 26.66..... | 1.35..... |
| (c) Miscellaneous..... | 160.00..... | 201.28..... | 125.60..... | 480.85..... | 844.26..... |
| 26. Coal..... | | 1,349.10..... | 1,845.07..... | 1,488.04..... | |
| 27. Oil: | | | | | |
| (a) Kerosene..... | .25..... | 37.54..... | 5.80..... | 6.70..... | 9.00..... |
| (b) Lubricating..... | 7.00..... | 113.36..... | 109.19..... | 3.84..... | 16.00..... |

[illegible]

TABLE XVI.—*Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.*

| 1. Name..... | Charotte. | Chickamauga. | Cathowee. | Cata. | Chocoma. |
|--|---------------------------------|--|---------------------------|---|---|
| 2. District..... | Louisville, Ky..... | Chattanooga, Tenn..... | Chattanooga, Tenn..... | Mississippi River, first and second districts, Memphis, Tenn..... | St. Louis, Mo., Mississippi River Commission. |
| 3. Where built..... | Jeffersonville, Ind. (rebuilt). | Muscle Shoals Canal, Ala..... | Jeffersonville, Ind..... | Jeffersonville, Ind..... | Dubuque, Iowa. |
| 4. When built..... | 1914, rebuilt. | 1915..... | 1908..... | 1897..... | 1890. |
| 5. Builder..... | Ed. J. Howard..... | U. S. Engineer Department. | E. J. Howard..... | Ed. J. Howard..... | Iowa Iron Works (old.). |
| 6. Time to build..... | 1 year..... | About 9 months..... | Not known..... | Unknown..... | 15 months. |
| 7. Where purchased..... | Jeffersonville, Ind..... | Jeffersonville, Ind..... | Jeffersonville, Ind..... | ..... | ..... |
| 8. When purchased..... | 1914..... | ..... | 1908..... | ..... | ..... |
| 9. From whom purchased..... | Ed. J. Howard..... | ..... | E. J. Howard..... | ..... | ..... |
| 10. Purchase price..... | \$17,257 (hull)..... | ..... | \$9,616.92..... | ..... | ..... |
| 11. Material of hull..... | Steel..... | Wood..... | Wood..... | Wood..... | Steel. |
| 12. Material of house..... | Wood and steel..... | do..... | do..... | do..... | Wood. |
| 13. Contract cost..... | \$17,257..... | \$18,675.15..... | \$9,616.92..... | \$25,900..... | \$45,672. |
| 14. Cost of outfit..... | \$7,625.73..... | \$1,282.27..... | \$1,000..... | \$2,100..... | \$19,400. |
| 15. Present value..... | \$25,000..... | \$13,457..... | \$5,807..... | \$26,449.87..... | ..... |
| 16. Hull: | | | | | |
| (a) Length over all..... | 142 feet 5 inches..... | 115 feet..... | 113 feet..... | 185 feet 6 inches..... | 169 feet 4 inches. |
| (b) Length on water line..... | 118 feet 3 inches..... | 94 feet 6 inches..... | 85 feet, approximate..... | 152 feet 6 inches..... | 167 feet 4 inches. |
| (c) Length of hull..... | 120 feet 10 inches..... | 100 feet..... | 100 feet..... | 154 feet 6 inches..... | 171 feet, 6 inches. |
| (d) Beam over all..... | 27 feet 6 inches..... | 22 feet 5 inches..... | 20 feet..... | 34 feet 11 inches..... | 37 feet 8 inches. |
| (e) Beam on water line..... | 25 feet 6 inches..... | 21 feet 6 inches..... | 19 feet..... | 30 feet 3 inches..... | 36 feet. |
| (f) Molded depth amidship..... | 5 feet 1 inch..... | 3 feet..... | 3 feet 6 inches..... | 5 feet..... | 5 feet 6 inches. |
| (g) Draft forward..... | 4 feet 4 inches..... | 2 feet..... | 2 feet 2 inches..... | 4 feet 8 inches..... | 4 feet. |
| (h) Draft aft..... | 3 feet 3 inches..... | 2 feet 4 inches..... | 2 feet..... | 3 feet 10 inches..... | 4 feet 7 inches. |
| (i) Displacement (long tons)..... | 278..... | 112 long tons..... | 104..... | 450..... | 560. |
| 17. Engines: | | | | | |
| (a) Number and type of propelling engines..... | 2 Friable, poppet valve..... | 2 slide valve poppet cut-off type..... | Chas. Hegewald Co..... | 2 simple high pressure non-condensing..... | 1 pair, horizontal high pressure. |
| (b) Diameter and stroke..... | 14½ inches by 6 feet..... | 9 inches diameter, 36-inch stroke..... | 9 by 36 inches..... | 18 inches diameter by 7-foot stroke..... | 22 inches by 8 feet. |
| (c) Revolutions per minute light..... | 26..... | 32..... | 37..... | 22..... | 15. |
| (d) Revolutions per minute, towing..... | 20..... | 26..... | 26..... | 18..... | 11. |
| 18. Paddle wheel: | | | | | |
| (a) Diameter..... | 17 feet..... | 11 feet..... | 11 feet..... | 22 feet..... | 24 feet. |
| (b) Number of buckets..... | 16..... | 10 feet..... | 10..... | 16..... | 16. |

| | 16 feet by 30 inches. | 14 feet long, 13 inches wide. | 13 feet long, 20 inches wide. | 21 feet 6 inches by 27 inches wide. | 24 feet by 34 inches. |
|--|-----------------------|--|--|---|--------------------------|
| c) Length and width of bucks. | | | | | |
| (d) Diameter of shaft. | 7 inches. | 5½ inches, hexagon shaft. | 5½ inches. | Hexagonal, 11 inches diameter of inscribing circle. | 12 inches. |
| (e) Number of wheel flanges. | 4. | 4. | 4. | 5. | 5. |
| 19. Boilers: | | | | | |
| (a) Number and type. | 3 Western River. | 2 marine boilers. | 2 marine. | 4 Mississippi River type, return flue. | 6, cylindrical, flue. |
| (b) Dimensions. | 40 inches by 24 feet. | Each 33 inches diameter, 14 feet long. | 36 inches diameter, 14 feet long (each). | 26 feet 6 inches long by 42 inches diameter. | 38 inches by 30 feet. |
| (c) Number and diameter of flues in case boiler. | Two 13-inch. | Six 6-inch flues in each. | Six 6 inches diameter. | 5 flues, 10 inches diameter. | 2 of 13 inches diameter. |
| (d) Total heating surface. | 1,080 square feet. | 450 square feet. | 516.42 square feet. | 2,124.9 square feet. | 2,472 square feet. |
| (e) Total grate surface. | 50 square feet. | 36 square feet. | 32 square feet. | 86.7 square feet. | 99 square feet. |
| (f) Steam pressure. | 200 pounds. | 200 pounds. | 190 pounds. | 155 pounds allowed. | 160 pounds. |
| 20. Speed in miles per hour (average of up and down stream speed). | 9. | 8. | 10. | 8. | 12. |
| 21. Towing capacity (speed). | 10 barges. | | 300 tons. | 8 barges of 500 tons load each. | 6 barges. |
| 22. Number of men in crew. | 9. | 8 to each shift. | 8 to each shift. | 15 single crew. | 14. |
| OPERATING COST. | | | | | |
| 23. Pay roll. | \$7,961.87 | \$3,702.50 | \$4,871.23 | \$9,749.60 | |
| 24. Subsidies. | 50.45 | 1,017.43 | 1,453.33 | 2,319.70 | |
| 25. Supplies: | | | | | |
| (a) Fuel. | 50.20 | 58.26 | 101.00 | 31.08 | |
| (b) Engine room. | 44.63 | 59.18 | 75.00 | 11.36 | |
| (c) Boiler room. | 997.60 | 122.85 | 276.65 | | |
| (d) Miscellaneous. | 2,867.99 | 1,104.60 | 1,591.38 | 5,462.50 | |
| 26. Coal. | | | | | |
| 27. Oil: | | | | | |
| (a) Kerosene. | 15.02 | 44.26 | 75.17 | 37.50 | |
| (b) Lubricating. | 20.34 | 107.62 | 179.91 | 83.30 | |
| 28. Ordinary repairs: | | | | | |
| (a) Hull. | 319.25 | 391.56 | 153.83 | 620.37 | \$187.30 |
| (b) Machinery. | 886.15 | 75.72 | 376.04 | 75.00 | 431.66 |
| 29. Extraordinary repairs: | | | | | |
| (a) Hull. | | | | | 1,116.20 |
| (b) Machinery. | | | | | |
| 30. Alterations and additions: | | | | | |
| (a) Hull. | | | | | |
| (b) Machinery. | | | | | |
| 31. Laundry, food and miscellaneous expenses. | 39.07 | 36.00 | | 351.40 | |
| 32. Office expenses. | | | | (1) | |
| 33. Total. | \$12,771.07 | \$6,745.20 | \$9,452.53 | \$18,780.81 | \$1,836.15 |

TABLE XVI.—Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name..... | Cherokee. | Chickamauga. | Chilhowee. | Chico. | Choctaw. |
|--|---|--|---|---|---|
| OPERATING COST—contd. | | | | | |
| 24. Cost of coal per long ton..... | \$2.40..... | \$2.20..... | \$2.30..... | \$2.80..... | |
| 35. Cost of oil per gallon..... | 64 to 80 cents. | 50 cents. | 47½ cents. | Keweenaw, 8 to 10 cents; lubricating, 33 to 60 cents. | |
| 36. By whom and when repairs were made. | United States during the year. | U. S. Engineer Department. | U. S. Engineer Department. | (1) | United States, during year. |
| 37. Days under steam..... | 286..... | 243..... | 254..... | 266..... | |
| 38. Remarks on work done by towboat during year. | <p>Remarks.</p> <p>Acted as dredge tender in the Louisville and Portland Canal and did miscellaneous towing in the canal and on the Ohio River between Dams Nos. 41 and 43.</p> <p>¹ Not including cost of machinery transferred from old boat.</p> | <p>Remarks.</p> <p>Williams, Sals Creek and Coulter Island Shoals, Tennessee River.</p> | <p>Remarks.</p> <p>Williams and Lyons Shoals, Tennessee River.</p> | <p>Remarks.</p> <p>¹ Not kept separately.
 ² United States from time to time as required.
 ³ Tender to revetment party at Bullertin Bar, Ark., and towing brush for Gayoso and Barfield, Ark. revetment parties; miles run, 7,756; barges towed, 95 upstream and 122 downstream; double crew for about one month.</p> | <p>Remarks.</p> <p>Not used during year.</p> |

| 1. Name. | Coal Bluff. | Coast. | Columbus. | Comanche. | Control. |
|--|------------------------|--|--------------------------------------|------------------------------|---|
| 2. District. | Rock Island, Ill. | Chattanooga, Tenn. | Montgomery, Ala. | Chicago, Ill. | Third Mississippi River. |
| 3. Where built. | Ohio River. | Jeffersonville, Ind. | Bainbridge, Ga. | Dubuque, Iowa. | Jeffersonville, Ind. |
| 4. When built. | 1878. | 1891; rebuilt by States 1915 (hull). | 1904. | 1915. | 1906. |
| 5. Builder. | | E. J. Howard. | M. A. Sweeney Shipyard & Foundry Co. | Dubuque Boat & Boiler Works. | Ed J. Howard. |
| 6. Time to build. | Ohio River. | 6 months. | 11 months. | 11 months. | Not known. |
| 7. Where purchased. | 1881. | Jeffersonville, Ind. | Bainbridge, Ga. | | Paducah, Ky. |
| 8. When purchased. | C. M. Cole. | E. J. Howard. | M. A. Sweeney Shipyard & Foundry Co. | | 1906. |
| 9. From whom purchased. | | | | | Augustus B. Hart, St. Louis, Mo. |
| 10. Purchase price. | \$8,000. | \$9,500. | \$20,700. | | \$12,000. |
| 11. Material of hull. | Oak. | Wood. | Wood. | Steel. | Wood. |
| 12. Material of house. | Pine. | do. | do. | Wood. | Do. |
| 13. Contract cost. | (1). | \$9,500. | Included in purchase price. | \$34,806. | Not known. |
| 14. Cost of outfit. | | \$2,500. | | \$2,000. | Do. |
| 15. Present value. | \$10,294.50. | \$16,064. | \$16,000. | \$23,250. | \$7,500. |
| 16. Hull: | | | | | |
| (a) Length over all line. | 148 feet. | 139 feet 6 inches. | 154 feet. | 141 feet. | 157 feet. |
| (b) Length on water line. | 124 feet 4 inches. | 112 feet. | 141 feet. | 117 feet 6 inches. | 132 feet. |
| (c) Length of hull. | 129 feet. | 120 feet. | 135 feet. | 120 feet. | 136 feet. |
| (d) Beam over all. | 28 feet 6 inches. | 28 feet 24 inches. | 28 feet. | 28 feet 2 inches. | 29 feet 8 inches. |
| (e) Beam on water line. | 25 feet. | 24 feet 4 inches. | do. | 26 feet 6 inches. | 26 feet 6 inches. |
| (f) Molded depth amidship. | 4 feet 6 inches. | 4 feet 3 inches. | 4 feet. | 5 feet 7 inches. | 4 feet 8 inches. |
| (g) Draft forward. | 3 feet. | 2 feet 6 inches. | 2 feet 6 inches. | 3 feet 6 inches. | 1 foot 6 inches. |
| (h) Draft aft. | 2 feet 10 inches. | do. | do. | 3 feet 6 inches. | 2 feet 6 inches. |
| (i) Displacement (long tons). | 230. | 185. | 231. | 200. | 232.9. |
| 17. Engines: | | | | | |
| (a) Number and type of propelling engines. | 22 poppet valve lever. | 2 lever. | 3 horizontal, direct-acting. | 2 balanced piston valves. | 2 high pressure noncondensing. |
| (b) Diameter and stroke. | 15 inches by 5 feet. | 104 inches diameter, 4 feet 6 inches stroke. | 14 inches diameter, 5-foot stroke. | 14 by 72 inches. | 13 feet 6 inches diameter by 5-foot stroke. |
| (c) Revolutions per minute, light. | 26. | 28. | 26. | 21. | 22. |
| (d) Revolutions per minute, towing. | 20. | 22. | 22. | 16. | 18. |

TABLE XVI.—Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name..... | Coal Bluff. | Colbert. | Columbus. | Comanche. | Control. |
|--|---|--|--|---|---|
| 18. Paddle wheel:
(a) Diameter.....
(b) Number of buck-
ets.....
(c) Length and
width of buck-
ets.....
(d) Diameter of shaft
(e) Number of wheel
flanges..... | 18 feet 3 inches.....
14.....
14 feet by 24 inches.....
8 inches.....
4..... | 14 feet 3 inches.....
12.....
17 feet long by 22 inches wide.....
6 inches.....
4..... | 15 feet 5 inches.....
14.....
18 feet by 24 inches.....
7½ inches.....
4..... | 16 feet 10 inches.....
14.....
16 feet 10 inches by 30 inches.....
8 inches.....
5..... | 17 feet 6 inches.....
14.....
17 feet 6 inches long, 24 inches
wide.....
7 inches.....
4..... |
| 19. Boilers:
(a) Number and
type.....
(b) Dimensions.....
(c) Number and
diameter of
flues in one
boiler.....
(d) Total heating
surface.....
(e) Total grate sur-
face.....
(f) Steam pressure.....
(g) Speed in miles per hour
(average of up and
down stream speed).....
(h) Towing capacity.....
(i) Number of men in crew | 3 external fire type.....
24 feet by 36 inches.....
6 of 13 inches diameter.....
780 square feet.....
53 square feet.....
180 pounds.....
8.....
5 barges, 600-ton load, 24 miles
per hour upstream.....
13..... | 2 marine.....
36 inches diameter, 22 feet
long.....
Six 6 inches diameter.....
678 square feet.....
34 square feet.....
200 pounds.....
11 miles.....
600 tons.....
13..... | 2 return flue, Mississippi
River.....
42 inches by 24 feet.....
2.....
745.38 square feet.....
37½ square feet.....
165 pounds.....
12.....
350 tons.....
20..... | 3 horizontal.....
40 inches by 24 feet.....
Three 9 inches and three 6
inches.....
1,370 square feet.....
50 square feet.....
200 pounds.....
10.....
1,000 tons 3 miles per hour
upstream.....
10..... | 2 Mississippi River return
flue.....
42 inches by 26 feet.....
Two 16 inches diameter.....
838 square feet.....
38 square feet.....
175 pounds.....
11.....
500 tons upstream; 1,500 tons
downstream.....
14..... |
| OPERATING COST. | | | | | |
| 28. Pay roll..... | \$3,490.84 | \$5,755.03 | \$10,024.40 | \$4,312.66 | \$5,538.68 |
| 29. Subsistence..... | 811.24 | 1,477.86 | 2,727.51 | 1,179.75 | 1,694.92 |
| 30. Supplies: | | | | | |
| (a) Engine room..... | 2.40 | 220.55 | 140.60 | 15.03 | 175.00 |
| (b) Boiler room..... | 1.15 | 40.10 | 86.18 | 17.06 | 103.01 |
| (c) Miscellaneous..... | 447.08 | 232.55 | 1,098.91 | 103.01 | 263.40 |
| 31. Coal..... | 1,721.53 | 2,863.40 | 1,860.83 | 1,770.14 | 1,533.88 |
| 32. Oil: | | | | | |
| (a) Kerosene..... | 4.86 | 46.45 | 21.28 | 4.74 | 4.74 |
| (b) Lubricating..... | 21.80 | 108.08 | 52.55 | 64.71 | 54.00 |

[illegible]

TABLE XVI.—Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name..... | Copple, H. St. L. | Craftsman, General. | Crozet. | E. A. W. | Ethor. |
|--|--------------------------------------|----------------------------------|---|------------------------------------|--------------------------------|
| 2. District..... | Third, Mississippi River. | Wheeling, W. Va. | Wheeling, W. Va. | First, Cincinnati, Ohio. | Rock Island, Ill. |
| 3. Where built..... | Jeffersonville, Ind. | Jeffersonville, Ind. | Evansville, Ind. | New Albany, Ind. | Jeffersonville, Ind. |
| 4. When built..... | 1903-4. | 1911. | 1908. | 1901. | 1904-5. |
| 5. Builder..... | Ed. J. Howard. | E. J. Howard. | Ohio River Contract Co. | Chas. Hegewald (Co.) | W. A. Sweeney Co. |
| 6. Time to build..... | 1 year 10 months. | 11 months. | Unknown. | 6 months. | 8 months. |
| 7. Where purchased..... | | | Evansville, Ind. | | |
| 8. When purchased..... | | | Apr. 26, 1915. | | |
| 9. From whom purchased..... | | | Ohio River Contract Co. | | |
| 10. Purchase price..... | | | \$8,500. | | |
| 11. Material of hull..... | Steel. | Steel. | Wood. | Steel. | Wood. |
| 12. Material of house..... | Wood. | Wood. | do. | | Do. |
| 13. Contract cost..... | \$53,900. | \$27,550. | Unknown. | \$2,358.33. | \$16,000. |
| 14. Cost of outfit..... | Not known. | \$730.98. | Included in cost of boat. | | \$796. |
| 15. Present value..... | \$31,000. | \$14,000. | \$6,500. | \$500. | \$7,428.97. |
| 16. Hull: | | | | | |
| (a) Length over all..... | 166 feet. | 133 feet 9 inches. | 115 feet. | 30 feet. | 146 feet. |
| (b) Length on water line..... | 136 feet. | 112 feet 6 inches. | 99 feet 9 inches. | 28 feet 6 inches. | 116 feet. |
| (c) Length of hull..... | 140 feet. | 116 feet 6 inches. | 99 feet 6 inches. | | 125 feet. |
| (d) Beam over all..... | 24 feet. | 28 feet. | 21 feet. | 9 feet 6 inches. | 27 feet. |
| (e) Beam on water line..... | 30 feet. | 27 feet. | 19 feet. | | 25 feet 3 inches. |
| (f) Molded depth amidship..... | 6 feet. | 4 feet 3 inches (6-inch camber). | 3 feet. | 2 feet 6 inches. | 4 feet 3 inches. |
| (g) Draft forward..... | 5 feet. | 3 feet. | 2 feet 11 inches. | 1 foot 1 inch. | 2 feet 8 inches. |
| (h) Draft aft..... | 4 feet 6 inches. | 2 feet 6 inches. | 3 feet. | 1 foot 1 inch. | 2 feet 8 inches. |
| (i) Displacement (long tons). | 340.45. | 198. | 101. | 16. | 185. |
| 17. Engines: | | | | | |
| (a) Number and type of propelling engines. | 2 high-pressure, noncondensing. | 2 poppet balanced-valve type. | 2 horizontal piston valve, noncondensing. | 2 piston slide valve. | 2 noncondensing high pressure. |
| (b) Diameter and stroke. | 18 inches diameter by 7-foot stroke. | 12 inches by 5 feet. | 104 by 48 inches. | 6 inches diameter, 18-inch stroke. | 12 inches by 6 feet. |
| (c) Revolutions per minute, light. | 13. | 24. | 21. | 60 to 70. | 23. |
| (d) Revolutions per minute, towing. | 16. | do. | 16. | | 18. |
| 18. Paddle wheel: | | | | | |
| (a) Diameter..... | 21 feet. | 15 feet 3 inches. | 14 feet 1 inch. | 6 feet. | 16 feet. |
| (b) Number of buckets..... | 15. | 12 staggered. | 12. | 9. | 14. |
| (c) Length and width of buckets..... | 21 feet long by 30 inches wide. | 30 inches by 19 feet. | 12 feet 9 inches by 24 inches by 14 inches. | 6 feet 2 inches by 14 inches. | 15 by 2 feet. |

| (d) Diameter of shaft
(e) Number of wheel
flanges. | 10 inches. | 7-inch, hexagonal. | 6 inches. | 8½ inches, hexagon. |
|--|--|------------------------------------|-----------------------------------|--------------------------------------|
| | | | | |
| 19. Bollers: | | | | |
| (a) Number and type. | 4 Mississippi River return-flue. | 2 cylindrical marine, 6-inch flue. | 2 double-flue marine. | 3 horizontal flue, externally fired. |
| (b) Dimensions. | 42 inches by 26 feet. | 40 inches by 22 feet. | 18 feet long, 37 inches diameter. | 20 feet long, 34 inches diameter. |
| (c) Number and diameter of flues in one boiler. | Two 12 inches and three 10 inches. | Four 4 inches; two 6 inches. | Two 12 inches diameter. | Five of 7 inches diameter. |
| (d) Total heating surface. | 2,042 square feet. | 794 square feet. | 17,264 square inches. | 910 square feet. |
| (e) Total grate surface. | 72 square feet. | 38 square feet. | 16 square feet. | 35½ square feet. |
| (f) Steam pressure. | 200 pounds. | 186 pounds. | 197 pounds. | 180 pounds. |
| 20. Speed in miles per hour (average of up and down stream speed). | 10 | 10 | 7 | 10½ |
| 21. Towing capacity. | 1,500 tons up, 6,000 tons down stream. | 14 barges, 7,000 tons. | 6 barges. | 1,500-ton tow at 2½ miles per hour. |
| 22. Number of men in crew. | Single, 16; double, 26. | 7 | 7 | 15, double. |
| OPERATING COST. | | | | |
| 23. Pay roll. | \$9,177.29 | \$7,533.56 | \$6,094.64 | \$2,838.28 |
| 24. Subsistence. | 2,498.94 | | | \$2,560.17 |
| 25. Supplies: | | | | |
| (a) Engine room. | 205.66 | 104.18 | 73.98 | 64.17 |
| (b) Boiler room. | | 40.00 | 110.72 | 48.65 |
| (c) Miscellaneous. | 185.00 | 1,068.51 | 1,135.56 | 120.10 |
| 26. Coal. | 6,509.72 | 3,123.23 | 1,668.73 | 1,606.01 |
| 27. Oil: | | | | |
| (a) Kerosene. | 15.50 | 11.45 | 20.10 | 2.46 |
| (b) Lubricating. | 70.00 | 84.91 | 28.31 | 16.46 |
| 28. Ordinary repairs: | | | | |
| (a) Hull. | 316.01 | 610.06 | 291.89 | 87.80 |
| (b) Machinery. | 66.66 | 2,265.20 | 817.46 | 176.21 |
| 29. Extraordinary repairs: | | | | |
| (a) Hull. | 442.66 | | 229.85 | |
| (b) Machinery. | 3,708.84 | 1,508.84 | 205.71 | |
| 30. Alterations and additions: | | | | |
| (a) Hull. | | | | |
| (b) Machinery. | | | | |
| 31. Laundry, ice, and miscellaneous expenses. | 101.00 | 172.54 | 460.00 | 60.09 |
| 32. Office expenses. | | | 319.30 | |
| 33. Total. | \$23,287.26 | \$16,542.48 | \$11,456.25 | \$5,567.40 |

TABLE XVI.—Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name..... | Coppée, H. St. L. | Craighill, General. | Crosst. ¹ | E. A. W. | Elmer. |
|--|--|---|--|---|--|
| OPERATING COST—contd. | | | | | |
| 34. Cost of coal per long ton..... | 53..... | \$1.52 to \$3.92..... | \$2.78..... | | \$2.55. |
| 35. Cost of oil per gallon..... | 30 to 60 cents..... | 28 cents, cylinder; 15 cents, engine; 9 cents, kerosene. | 16 cents and 27 cents gallon..... | | Cylinder, 23 and 24 cents; engine, 21 cents; kerosene, 6.7 cents. |
| 36. By whom and when repairs were made..... | U. S. fleet, Vicksburg, Miss.. | (7)..... | By United States, at various times..... | | United States, during year. |
| 37. Days under steam..... | 256..... | 270..... | 345..... | | 75. |
| 38. Remarks on work done by towboat during year. | <i>Remarks.</i>
1 Operated with single crew, 103 days; with double crew, 153 days; towing revetment material, 10,323 miles with tow, 1,866 miles light. | <i>Remarks.</i>
Operated principally at Dam No. 22, Ohio River, during construction of that work, towing floating plant, acting as tender to dipper dredge Col. M. B. Adams, etc.
1 Including manila rope.
2 Repairs were made as follows: To boiler, by Acme Boiler Works, Gallipolis, Ohio, Jan. 18, 1916, to Jan. 22, 1916; to boiler, by The E. C. Coughenour Co., Huntington, W. Va., Feb. 24, 1916, to Mar. 14, 1916; to boiler, by Middleport Boiler Works, Middleport, Ohio, Apr. 6, 1916, to Apr. 19, 1916; to boiler, by The E. C. Coughenour Co., Huntington, W. Va., Apr. 26, 1916, to May 22, 1916. | <i>Remarks.</i>
At Dam No. 21, Ohio River, in connection with construction of the dam.
1 Formerly R. J. Armstrong. | <i>Remarks.</i>
Not operated during the calendar year ending Dec. 31, 1916.
1 Small repairs and painting. | <i>Remarks.</i>
Subdivision Wisconsin River to Le Claire; towing materials and floating plant in connection with improving upper Mississippi River. |

| 1. Name..... | Edm. | Elde. | Emerald. | Emily. | Evans, John. |
|--|------------------------------|--------------------------|------------------------|-----------------------|---|
| 2. District..... | Rock Island..... | Rock Island, Ill..... | Louisville, Ky..... | Rock Island..... | St. Louis, Mo.; Mississippi River Commission. |
| 3. Where built..... | La Crosse, Wis..... | Jeffersonville, Ind..... | Cincinnati, Ohio..... | Keokuk, Iowa..... | Jeffersonville, Ind. |
| 4. When built..... | 1907..... | 1899..... | 1899..... | 1899..... | 1913..... |
| 5. Builder..... | W. W. Cargill..... | M. A. Sweeney & Bro..... | Chas. Barnes Co..... | United States..... | M. A. Sweeney Shipyard & Foundry Co. |
| 6. Time to build..... | Not known..... | 8 months..... | 6 months..... | 8 months..... | 17 months 10 days. |
| 7. Where purchased..... | La Crosse, Wis..... | La Crosse, Wis..... | Cincinnati, Ohio..... | ..... | ..... |
| 8. When purchased..... | 1911..... | ..... | 1899..... | ..... | ..... |
| 9. From whom purchased..... | Estate of W. W. Cargill..... | ..... | Chas. Barnes Co..... | ..... | ..... |
| 10. Purchase price..... | \$12,000..... | ..... | \$2,975..... | ..... | ..... |
| 11. Material of hull..... | Oak..... | Steel..... | Wood..... | Oak..... | Steel. |
| 12. Material of house..... | Pine..... | Wood..... | do..... | Pine..... | Wood. |
| 13. Contract cost..... | ..... | \$5,110..... | No record..... | \$4,000..... | \$23,490. |
| 14. Cost of outfit..... | Included in above..... | ..... | \$2,000..... | \$1,761.35..... | \$1,400. |
| 15. Present value..... | ..... | \$1,665.60..... | ..... | ..... | \$21,200. |
| 16. Hull: | | | | | |
| (a) Length over all..... | 144 feet..... | 75 feet..... | 76 feet 9 inches..... | 78 feet 6 inches..... | 136 feet 6 inches. |
| (b) Length on water line..... | 119 feet..... | 63 feet..... | 58 feet..... | 64 feet..... | 111 feet 6 inches. |
| (c) Length of hull..... | 125 feet..... | 65 feet..... | ..... | 66 feet..... | 114 feet. |
| (d) Beam over all..... | 26 feet 8 inches..... | 15 feet 10 inches..... | 14 feet..... | 18 feet..... | 23 feet. |
| (e) Beam on water line..... | 26 feet..... | 13 feet..... | 11 feet 10 inches..... | 12 feet..... | 21 feet. |
| (f) Moulded depth amidship..... | 4 feet 6 inches..... | 3 feet..... | 3 feet 3 inches..... | 3 feet..... | 4 feet 10 inches. |
| (g) Draft forward..... | 3 feet..... | 2 feet 6 inches..... | 1 foot 8 inches..... | 2 feet 6 inches..... | 2 feet 10 inches. |
| (h) Draft aft..... | 3 feet..... | 2 feet 6 inches..... | 1 foot 8 inches..... | 2 feet 6 inches..... | 3 feet 2 inches. |
| (i) Displacement (long tons)..... | 200..... | 40..... | 36..... | 26..... | 163. |
| 17. Engines: | | | | | |
| (a) Number and type of propelling engines..... | 2 horizontal..... | 2 side-valve..... | 2 piston-valve..... | 2 side-valve..... | 1 pair horizontal, high-pressure. |
| (b) Diameter and stroke..... | 11 inches by 6 feet..... | 6 by 42 inches..... | 6 by 26 inches..... | 9 by 24 inches..... | 11 inches by 6 feet. |
| (c) Revolutions per minute, light..... | 21..... | 35..... | 26..... | 30..... | 20. |
| (d) Revolutions per minute, towing..... | 15..... | 28..... | 20..... | 21..... | 17. |

TABLE XVI.—Report of operations of tug and survey boats (paddle-steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name..... | Ellen. | Elise. | Emerald. | Emily. | Euena, John. |
|--|---|---|--|---|---|
| 18. Paddle wheel:
(a) Diameter.....
(b) Number of buckets.....
(c) Length and width of buckets.....
(d) Diameter of shaft.....
(e) Number of wheel flanges..... | 18 feet.....
17.....
18 feet by 24 inches.....
8 inches.....
4..... | 8 feet 10 inches.....
9.....
8½ feet long, 15 inches wide.....
4 inches.....
13..... | 9 feet 8 inches.....
15.....
13 inches by 8 feet.....
3½ inches.....
8..... | 10 feet 4 inches.....
11.....
9 feet by 15 inches.....
3½ inches.....
8..... | 18 feet.....
13.....
14 feet by 24 inches.....
6½ inches.....
4..... |
| 19. Boiler:
(a) Number and type.....
(b) Dimensions.....
(c) Number and diameter of flues in one boiler.....
(d) Total heating surface.....
(e) Total grate surface.....
(f) Steam pressure.....
(g) Speed in miles per hour (average of up and down stream speed).
(h) Towing capacity..... | 1 Bouzon.....
16 feet by 60 inches.....
64 of 3½ inches diameter.....
1,182 square feet.....
20 square feet.....
180 pounds.....
10.....
Good..... | 1 tubular.....
34 inches diameter, 12 feet long.....
26; 3 inches by 10 feet.....
264 square feet.....
12 square feet.....
200 pounds.....
9.....
2 loaded barges..... | 1 fire-box gunboat.....
4 feet by 7.6 feet.....
101; 2 inches.....
260 square feet.....
9 square feet.....
160 pounds.....
6.....
3 barges..... | 1 horizontal fire-tube.....
10 feet by 38 inches.....
22 of 3 inches diameter.....
240 square feet.....
14 square feet.....
197 pounds.....
10.....
50 tons up Rock Island Rapids.
6 single crew, 11 double crew. | 2 cylindrical flue.....
46 inches by 18 feet.....
20 of 4½ inches.....
1,124 square feet.....
40½ square feet.....
176 pounds.....
10½.....
1 barge..... |
| 22. Number of men in crew..... | 10..... | 7..... | 4..... | | |
| OPERATING COST. | | | | | |
| 23. Pay roll..... | \$3,210.42 | \$1,230.31 | \$1,180.26 | \$1,764.00 | \$5,123.13 |
| 24. Subsistence..... | 1,019.80 | 430.20 | 4.26 | 663.94 | 1,230.23 |
| 25. Supplies: | | | | | |
| (a) Engine room..... | 34.61 | 2.00 | 16.46 | 8.82 | 45.73 |
| (b) Boiler room..... | 14.11 | 2.96 | 10.91 | 2.17 | 2.17 |
| (c) Miscellaneous..... | 4.02 | 11.61 | 34 | 84.01 | 6.21 |
| 26. Coal..... | 1,371.36 | 332.64 | 319.86 | 618.96 | 2,029.66 |
| 27. Oil: | | | | | |
| (a) Kerosene..... | 7.99 | 3.94 | 1.14 | 1.92 | 11.98 |
| (b) Lubricating..... | 15.54 | 13.16 | 1.25 | 4.33 | 11.46 |

| | | | | | |
|--|---|---|---|---|---|
| 28. Ordinary repairs: | 998.54 | 629.28 | 59.65 | 61.28 | 648.30 |
| (a) Hull | 410.97 | 117.00 | 102.14 | 85.39 | 402.71 |
| (b) Machinery | | | | | |
| 29. Extraordinary repairs: | | | | | |
| (a) Hull | | | | | |
| (b) Machinery | | | | | |
| 30. Alterations and additions: | | | | | |
| (a) Hull | | | | | |
| (b) Machinery | | | | | |
| 31. Laundry, fuel, and miscellaneous expenses. | 126.59 | 18.61 | 2.22 | 244.22 | 61.34 |
| 32. Office expenses. | | | | 16.32 | |
| 33. Total | \$7,013.69 | | | | 24.15 |
| 34. Cost of coal per long ton. | \$2.46 | \$3,705. | \$2,807.00 | \$3,428.64 | \$4.23 and \$2.91. |
| 35. Cost of oil per gallon. | | 8 to 26 cents. | \$2.90. | Valve, \$0.235; engine, \$0.23; cup grease, \$0.12; kerosene, \$0.0708. | Signal, 51.25 cents; head-light, 11.3 cents; cylinder, 26.91 cents; engine, 12 cents. |
| 36. By whom and when repairs were made. | United States, as needed | United States, 1916. | United States, 1916. | By United States, as needed. | United States, during year. |
| 37. Days under steam. | 150. | 96. | 215. | 124. | 174. |
| 38. Remarks on work done by towboat during year. | Dredge tender and towing. | Towing rock and brush. | | (1). | |
| Remarks. | Upper Mississippi River. | Remarks. | Remarks. | Remarks. | Remarks. |
| | Operated on Mississippi River between Fountain City to Wisconsin River. | Employed in miscellaneous towing in connection with the construction of Dam No. 43, Ohio River. | In use on upper Mississippi River, division Hannibal to Missouri River. While tending dipper dredges and towing rock this boat employed a double crew of 11 men; while on light-house work only 6 men were employed. Used towing rock for revetment work; tending dipper dredges and placing buoys for lighthouse department. | | Mississippi River and tributaries below Cairo, Ill., on gauge inspection and survey work. |

TABLE XVI.—Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—(Continued).

| 1. Name..... | Foz. | Foz. | Fury. | Greece. | Graham. |
|--|-------------------|-----------------------------------|--|----------------------------|---|
| 2. District..... | Chicago, Ill. | Milwaukee, Wis. | Rock Island, Ill. | Rock Island, Ill. | Mississippi River, first and second districts, Memphis, Tenn. |
| 3. Where built..... | Keokuk, Iowa. | Oskosh, Wis. | Dubuque, Iowa. | Keokuk, Iowa. | Pittsburgh, Pa. |
| 4. When built..... | 1897. | 1900. | 1881. | 1903. | 1879. |
| 5. Builder..... | United States. | George Ryan. | Jos. Reynolds. | U. S. Engineer Department. | Unknown. |
| 6. Time to build..... | Not known. | 6 months. | 9 months. | 6 months. | Do. |
| 7. Where purchased..... | | | Dubuque, Iowa. | | Pittsburgh, Pa. |
| 8. When purchased..... | | | 1881. | | 1884. |
| 9. From whom purchased..... | | | Jos. Reynolds. | | Kress Bros. |
| 10. Purchase price..... | | | \$11,976. | | \$9,500. |
| 11. Material of hull..... | Wood. | Wood. | Wood. | Wood. | Wood. |
| 12. Material of house..... | do. | do. | do. | do. | Do. |
| 13. Contract cost..... | \$4,386. | \$7,135. | \$11,976. | \$7,843. | \$1,000. |
| 14. Cost of outfit..... | \$400. | \$808.46. | \$800. | \$284 included in above. | \$17,619.16. |
| 15. Present value..... | | \$3,259.07. | \$6,717.40. | \$2,864.10. | |
| 16. Hull: | | | | | |
| (a) Length over all line..... | 80 feet 6 inches. | 107 feet 9 inches. | 128 feet 6 inches. | 92 feet 6 inches. | 136 feet 1 inch. |
| (b) Length on water line..... | 61 feet 9 inches. | 102 feet. | 111 feet. | 72 feet 6 inches. | 116 feet. |
| (c) Length of hull..... | 65 feet. | 107 feet 9 inches. | 113 feet. | 79 feet. | 119 feet 4 inches. |
| (d) Beam over all..... | 12 feet 3 inches. | 30 feet. | 25 feet 4 inches. | 17 feet. | 23 feet 5 inches. |
| (e) Beam on water line..... | 11 feet. | 18 feet 4 inches. | 22 feet 4 inches. | 15 feet. | 21 feet 7 inches. |
| (f) Molded depth amidship..... | 3 feet. | 5 feet. | 4 feet. | 4 feet. | 4 feet. |
| (g) Draft forward..... | 2 feet. | 3 feet 3 inches. | 2 feet 2 inches. | 2 feet 6 inches. | 2 feet 6 inches. |
| (h) Draft aft..... | 2 feet 1 inch. | 3 feet 4 inches. | 2 feet 2 inches. | 2 feet 6 inches. | 2 feet 6 inches. |
| (i) Displacement (long tons)..... | 17. | 128. | 110. | 138. | 138. |
| 17. Engines: | | | | | |
| (a) Number and type of propelling engines..... | 2, slide valve. | 2, horizontal, noncondensing | 2 simple balances poppet, California cut-off, noncondensing. | 2 lever with poppet valve. | 2, simple, high-pressure, non-condensing. |
| (b) Diameter and stroke..... | 6 by 49 inches. | 12-inch diameter, 36-inch stroke. | 10 by 48 inches. | 7½ by 49 inches. | 11 inches diameter by 4-foot stroke. |
| (c) Revolutions per minute, light..... | 30. | 38. | 22. | 30. | 24. |
| (d) Revolutions per minute, towing..... | 23. | 17 to 24. | 18. | 17. | 21. |

[illegible]

TABLE XVI.—Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name..... | Fox. | Fox. | Fury. | Gracie. | Graden. |
|---|--|---|---|--|---|
| OPERATING COST—Contd. | | | | | |
| 30. Alterations and additions: | | | | | |
| (a) Hull..... | | | | | |
| (b) Machinery..... | | | | | |
| 31. Laundry, ice, and miscellaneous expenses..... | | | \$57.47 | | \$42.00 |
| 32. Office expenses..... | | \$120.00 | 7.55 | | (1) |
| 33. Total..... | \$65.50 | \$6,014.80 | | \$3,003.62 | \$6,225.29 |
| 34. Cost of coal per long ton..... | | \$4.84 | \$3.17 | \$3.08 | \$2.80. |
| 35. Cost of oil per gallon..... | | 27.7 cents. | | Average, \$0.20. | Kerosene, 8 to 10 cents; lubricating, 33 to 60 cents. |
| 36. By whom and when repairs were made..... | | United States, 1916. | United States. | United States. | (9). |
| 37. Days under steam..... | | 251 | 172 | 97, including Sundays. | 226. |
| 38. Remarks on work done by towboat during year. | Remarks.
Not operated, being unserviceable.
1 Includes cost of outfit. | Remarks.
1 Towing and attending dredges, transporting material, inspection trips, taking light posts, moving survey party from place to place and assisting in setting monuments and taking soundings, and assisting on repairs to locks, dams, etc., on Fox River, Wis. | Remarks.
Tender to U. S. Dredge Davenport, dredging channels between U. S. Lock and Dam No. 1 and the Omaha Bridge, above St. Paul, Minn.
1 Old boilers from U. S. steamer Henry Breesse installed on Fury, 1916. | Remarks.
Mississippi River. Rock Island division, Le Claire Canal, towing sand. | Remarks.
1 Not subsisted for time used as harbor boat at Memphis, Tenn.
2 Not kept separately.
3 United States at Government fleet, Memphis, Tenn.
4 Laid up at Government fleet 4 months for repairs to hull. Used harbor boat 4 months. Team, for 4 months. Used by survey party for 1 month. Used as tender to riverment party at Bartfield, Ark., 2 months. |

| 1. Name..... | Gregory. | Gurney, Ives. | Guyendot. | Henry. | Hider, Arthur. |
|--|---|--|--------------------------------------|----------------------------|--------------------------------------|
| 2. District..... | Secord, Cincinnati, Ohio. | Kansas City, Mo. | First, Cincinnati, Ohio. | Nashville, Tenn. | Third, Mississippi River. |
| 3. Where built..... | Jeffersonville, Ind. | Dubuque, Iowa. | Cincinnati, Ohio. | Jeffersonville, Ind. | Jeffersonville, Ind. |
| 4. When built..... | 1910. | 1911. | 1912. | 1903. | 1898. |
| 5. Builder..... | M. A. Sweeney Ship Yards Co. | Dubuque Boat & Boiler Works. | The Charles Barnes Co. | Ed. J. Howard. | Ed. J. Howard. |
| 6. Time to build..... | 9 months. | 10 months. | 10 months. | 3 months. | Not known. |
| 7. Where purchased..... | Dubuque, Iowa. | Dubuque, Iowa. | | | |
| 8. When purchased..... | 1911. | 1911. | | | |
| 9. From whom purchased..... | Dubuque Boat & Boiler Works. | Dubuque Boat & Boiler Works. | | | |
| 10. Purchase price..... | Wood. | Steel. | Steel and ingot iron. | Wood. | Steel. |
| 11. Material of hull..... | do. | Wood. | Wood. | do. | Wood. |
| 12. Material of house..... | do. | do. | do. | do. | do. |
| 13. Contract cost..... | \$16,915. | \$24,884.70. | \$43,374. | \$4,835. | \$37,450. |
| 14. Cost of outfit..... | \$2,685. | \$1,665.35. | \$2,652.66. | \$100. | Not known. |
| 15. Present value..... | \$13,000. | \$24,300. | \$44,000. | \$2,415. | \$27,000. |
| 16. Hull: | | | | | |
| (a) Length over all..... | 131 feet. | 135 feet. | 157 feet 11 inches. | 101 feet 3 inches. | 163 feet. |
| (b) Length on water line..... | 114 feet. | 114 feet 6 inches. | 138 feet. | 97 feet by 5 inches. | 126 feet. |
| (c) Length of hull..... | 115 feet. | 116 feet. | 137.5 feet. | 90 feet. | 140 feet. |
| (d) Beam over all..... | 24 feet 10 inches. | 26 feet 6 inches. | 31 feet 8 inch. | 18 feet 6 inches. | 34 feet. |
| (e) Beam on water line..... | 22 feet. | 23 feet 4 inches. | 30 feet. | 18 feet 4 inches. | 30 feet. |
| (f) Molded depth amidship..... | 4 feet 2 inches in the clear. | 5 feet. | 4 feet 3 inches. | 3 feet 1 inch. | 6 feet. |
| (g) Draft forward..... | 3 feet 8 inches. | 3 feet 10 inches. | 2 feet 5 inches. | 2 feet 1 inch. | 5 feet. |
| (h) Draft aft..... | 3 feet 6 inches. | 3 feet 21 inches. | 2 feet 5 inches. | 1 foot 6 inches. | 4 feet 6 inches. |
| (i) Displacement (long tons)..... | 240. | 191. | 229. | 34. | 350.45. |
| 17. Engines: | | | | | |
| (a) Number and type of propelling engines..... | 2 western river lever engine, California cut off. | 2 cross compound. | 2 noncondensing; California cut off. | 2 slide valve link motion. | 2 high-pressure noncondens. |
| (b) Diameter and stroke..... | 11 inches diameter; 5-foot stroke. | High pressure, 13 inches; low pressure, 26 inches; 5-foot. | 14 by 73 inches. | 8 by 28 inches. | 18 inches diameter by 7-foot stroke. |
| (c) Revolutions per minute, light..... | 28. | 23. | 28. | 32. | 18. |
| (d) Revolutions per minute, towing..... | 26. | 19. | 28. | 24. | 16. |

TABLE XVI.—Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name..... | Gregory. | Gurney, Lieut. | Coykendal. | Henry. | Edger, Arthur. |
|---|---|--|--|---|---|
| 18. Paddle wheel:
(a) Diameter.....
(b) Number of buckets.....
(c) Length and width of bucket.....
(d) Diameter of shaft.....
(e) Number of wheel flanges..... | 15 feet.....
14.....
15 feet by 21 inches.....
6½ inches.....
4..... | 16 feet.....
12.....
15 feet 2 inches by 24 inches.....
7½ inches.....
4..... | 16 feet.....
14.....
19½ feet by 26 inches.....
8 inches.....
6..... | 10 feet.....
12.....
14 feet by 14 inches.....
3½ inches.....
3..... | 21 feet.....
15.....
21 feet long by 30 inches wide.....
10 inches.....
5..... |
| 19. Boilers:
(a) Number and type.....
(b) Dimensions.....
(c) Number and diameter of flues in one boiler.....
(d) Total heating surface.....
(e) Total grate surface.....
(f) Steam pressure.....
(g) Speed in miles per hour (average of up and down stream speed).....
(h) Towing capacity..... | 2 cylindrical return flue, 4 flues in all, 14 inches diameter.....
40 inches diameter, 22 feet long.....
Two, 14 inches diameter.....
623 square feet.....
32 square feet.....
176 pounds.....
9½.....
1,200 tons..... | 2 Mississippi River.....
43 inches by 20 feet.....
Ten, 6 inches.....
630 square feet.....
92 square feet.....
180 pounds.....
9.....
5 barges; 626 tons cargo..... | 3 Mississippi River type.....
40 inches diameter, 24 feet long.....
Two, 14 inches.....
680 square feet.....
50 square feet.....
200 pounds.....
8 to 9 up, 13 down.....
9..... | 1 Scotch marine.....
42 inches by 15 feet 11 inches.....
Forty-three, 3 inches.....
385 square feet.....
12.5 square feet.....
190 pounds.....
6 to 9.....
150 tons.....
5..... | 4 Mississippi River return flue.....
42 inches by 26 feet.....
Two, 12 inches; and three, 10 inches.....
2,043 square feet.....
73 square feet.....
180 pounds.....
10.....
1,500 tons upstream; 6,000 tons downstream.....
Single, 16; double, 26..... |
| 22. Number of men in crew..... | 11..... | 9..... | 9..... | 6..... | 6..... |
| OPERATING COST. | | | | | |
| 23. Pay roll..... | \$8,076.35 | \$6,137.85 | \$6,397.59 | \$2,935.88 | \$3,642.55 |
| 24. Subsistence..... | | 1,394.12 | 1,180.61 | 564.07 | 8,184.11 |
| 25. Supplies:
(a) Engine room.....
(b) Boiler room.....
(c) Miscellaneous..... | 60.96
113.80
410.17
2,642.50 | 204.63
91.44
177.96
4,776.57 | 170.30
64.86
413.91
1,768.72 | 14.14
15.90
466.06
14.76 | 51.50
17.60
40.10
6,097.46 |
| 26. Coal..... | | | | | |
| 27. Oil:
(a) Kerosene.....
(b) Lubricating..... | 15.26
79.37 | 2.28
68.69 | 11.96
37.86 | 4.96
16.76 | 27.00
26.30 |

| | | | | | |
|--|---|---|---|---|--|
| 28. Ordinary repairs: | 280.32 | 155.74 | 182.79 | 315.52 | 368.53 |
| (a) Hull..... | 66.57 | 102.67 | 130.92 | 81.97 | 477.86 |
| (b) Machinery..... | | | | | |
| 29. Extraordinary repairs: | 245.00 | 474.96 | | | 684.58 |
| (a) Hull..... | 241.72 | | | | |
| (b) Machinery..... | | | | | |
| 30. Alterations and additions: | | | | | |
| (a) Hull..... | | | 500.38 | | |
| (b) Machinery..... | | | 5,443.31 | | |
| 31. Laundry, ice, and miscellaneous expenses. | 38.06 | 21.40 | 186.76 | | 33.50 |
| 32. Office expenses..... | 300.00 | 410.43 | 83.78 | | |
| 33. Total..... | \$12,472.90 | \$14,091.72 | \$16,650.68 | \$4,467.90 | \$18,683.19 |
| 34. Cost of coal per long ton | \$2.81 | \$3.21 (average) | \$1.98+ | \$2.76 | \$3. |
| 35. Cost of oil per gallon. | Lubricating, 23 cents; kerosene, 10 cents. | 34 cents. | | \$0.20 | 30 to 60 cents. |
| 36. By whom and when repairs were made. | United States..... | United States; during season | United States; spring and fall, 1916. | | United States fleet, Victoria, Miss. |
| 37. Days under steam. | 279 | 280 | 176 | 280 | 396. |
| 38. Remarks on work done by towboat during year. | Miscellaneous towing and Towling plant and materials for improvement works. | United States; during season | United States; spring and fall, 1916. | (c). | (c). |
| | Remarks. | Remarks. | Remarks. | Remarks. | Remarks. |
| | Kentucky River, Ky. | Operated on Missouri River (St. Joseph, Mo., to mouth.) | Served as tender to United States dredges engaged in dredging operations on Ohio River. During the season new boilers were installed on the boat. | 1 Tending dredge Savier, towing barges, shifting deck boats, etc. | 1 Operated with single crew 243 days and with double crew 60 days, towing revenue material: 8,806 miles with tow; 2,991 miles light. |

TABLE XVI.—*Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.*

| 1. Name..... | Hireseser. | Hynesid. | Isle de Bole. | Isosqueser. | Isosca. |
|--|---------------------------------|--|--|-------------------------------|---|
| 2. District..... | Chattanooga, Tenn..... | New Orleans, La..... | St. Louis, Mo..... | Third, Mississippi River..... | Mississippi River, first and second districts, Memphis, Tenn. |
| 3. Where built..... | Jeffersonville, Ind..... | Patterson, La..... | Jeffersonville, Ind..... | Jeffersonville, Ind..... | Carondelet, Mo. |
| 4. When built..... | 1908..... | 1904..... | 1894..... | 1912-13..... | 1893..... |
| 5. Builder..... | E. J. Howard..... | F. B. Williams & Co..... | M. A. Sweeney Co..... | Ed. J. Howard..... | Unknown. |
| 6. Time to build..... | Not known..... | 6 months..... | 11 months..... | 2 years..... | Do. |
| 7. When purchased..... | Jeffersonville, Ind..... | Patterson, La..... | Jeffersonville, La..... | ..... | ..... |
| 8. From whom purchased..... | 1908..... | 1905; rebuilt 1908-09..... | 1905; rebuilt 1908-09..... | ..... | ..... |
| 9. Purchase price..... | E. J. Howard..... | F. B. Williams..... | F. B. Williams..... | ..... | ..... |
| 10. Material of hull..... | \$9,816.92..... | \$2,200 for hull, shaft, and engine..... | \$2,200 for hull, shaft, and engine..... | ..... | ..... |
| 11. Contract cost..... | Wood..... | Wood..... | Wood..... | Steel..... | Iron. |
| 12. Cost of outfit..... | do..... | do..... | do..... | 171 feet..... | Wood. |
| 13. Present value..... | \$9,816.92..... | 102 feet 6 inches..... | 84 feet 8 inches..... | 140 feet 6 inches..... | \$9,800. |
| 14. Length over all..... | \$1,000..... | 87 feet 6 inches..... | 70 feet..... | ..... | \$3,500. |
| 15. Length on water..... | \$4,122..... | 89 feet..... | 71 feet..... | ..... | \$8,306.50. |
| 16. Beam over all..... | 115 feet 5 inches..... | 102 feet 6 inches..... | 13 feet 6 inches..... | ..... | 94 feet. |
| 17. Beam on water..... | 98 feet 6 inches..... | 87 feet 6 inches..... | 13 feet..... | ..... | 73 feet. |
| 18. Moulded depth..... | 101 feet..... | 89 feet..... | 13 feet..... | ..... | 73 feet. |
| 19. Draft forward..... | 23 feet 11 inches..... | 13 feet..... | 13 feet 6 inches..... | ..... | 15 feet 5 inches. |
| 20. Draft aft..... | 20 feet 6 inches..... | 17 feet 9 inches..... | 13 feet..... | ..... | 15 feet. |
| 21. Displacement..... | 3 feet 10 inches..... | 30 inches..... | 3 feet 6 inches..... | ..... | 5 feet. |
| 22. (long tons)..... | 2 feet 8 inches..... | 2 feet..... | 2 feet 2 inches..... | ..... | 4 feet. |
| 23. Number and type of propelling engines..... | 2 feet 2 inches..... | 3 feet..... | 2 feet 2 inches..... | ..... | 2 feet 6 inches. |
| 24. Diameter..... | 125..... | 75 tons..... | 50..... | ..... | 30. |
| 25. Stroke..... | 2414; valve; noncondensing..... | 2 high-pressure..... | 2 Gillett & Eason..... | ..... | 2 simple high-pressure, noncondensing. |
| 26. Revolutions per minute, light..... | 9 by 26 inches..... | 8 inches, 42-inch stroke..... | 8 inches by 4-foot stroke..... | ..... | 10 inches diameter by 4-foot stroke. |
| 27. Revolutions per minute, towing..... | 32..... | 26..... | 35..... | ..... | 24. |
| 28. Paddle wheel..... | 23..... | 22..... | 30..... | ..... | 22. |
| 29. Diameter..... | 11 feet 4 inches..... | 14 feet 5 inches..... | 10 feet..... | ..... | 10 feet 4 inches. |
| 30. Number of buckets..... | 10..... | 12..... | 10..... | ..... | 14. |
| 31. Length and width of buckets..... | 20 by 14 inches..... | 12 feet long, 20 inches wide..... | 10 feet long, 20 inches wide..... | ..... | 10 feet long by 20 inches wide. |

| (d) Diameter of shaft | 5 1/2 inches | 4 1/2 inches | 5 1/2 inches | 10 inches | Hexagonal, 6 inches diameter of inscribing circle. |
|--|-------------------------------------|--------------------------------------|---------------------------------------|---|--|
| | 3. | 4. | 3. | 6. | 6. |
| 19. Bolters: | | | | | |
| (a) Number of wheel flanges. | | | | | |
| (b) Dimensions: | | | | | |
| (c) Number and diameter of flues in one boiler. | 2 marine | 1 cylinder, dry back. | 1 Mississippi River | 4 Mississippi River return-flue. | 1 Mississippi River type, return-flue. |
| (d) Total heating surface. | 36 inches diameter by 14 feet long. | 6 feet 6 inches by 11 feet 6 inches. | 42 inches diameter, 13 1/2 feet long. | 42 inches by 26 feet. | 18 feet long by 44 inches diameter. |
| (e) Total grate surface. | Six; 6 inches | 42 flues, 3 1/2 inches diameter. | Four; 9 1/2 inches diameter. | Two 16 1/2 inches and three 9 inches. | 12 flues, 6 inches diameter. |
| (f) Steam pressure. | 516.42 square feet. | 530 square feet. | 240 square feet. | 2,000 square feet. | 389 square feet. |
| (g) Speed in miles per hour (average of up and down stream speed). | 32 square feet. | 15 square feet. | 20 square feet. | 68 square feet. | 26 square feet. |
| 20. Towing capacity. | 190 pounds | 180 pounds | 160 pounds | 191 pounds | 160 pounds allowed. |
| 21. Number of men in crew. | 300 tons. | 800 tons. | 400 tons. | 1,500 tons upstream; 6,000 tons downstream. | 1 barge of 600 tons load. |
| 22. Number of men in crew. | 7 to each shift. | 8. | 5. | Single, 16; double, 26. | 4. |
| OPERATING COST. | | | | | |
| 23. Pay roll. | \$3,965.76 | \$6,230.60 | \$382.60 | \$9,000.72 | \$1,711.65 |
| 24. Subsistence. | 1,254.55 | 1,644.36 | 50.28 | 2,635.00 | (1) |
| 25. Supplies: | | | | | |
| (a) Engine room. | 62.87 | 115.47 | 8.10 | 175.00 | 19.95 |
| (b) Boiler room. | 19.00 | 47.74 | 4.00 | 100.00 | 7.55 |
| (c) Miscellaneous. | 25.72 | 63.53 | 380.94 | 4,613.56 | 991.54 |
| 26. Coal. | 892.64 | 13.50 | | | |
| 27. Oil: | | | | | |
| (a) Kerosene. | 18.81 | 1,220.44 | .26 | | 3.72 |
| (b) Lubricating. | 82.72 | 19.63 | | | 23.86 |
| 28. Ordinary repairs: | | | | | |
| (a) Hull. | 55.84 | 678.91 | 110.46 | 305.76 | 75.00 |
| (b) Machinery. | 168.20 | 171.00 | 132.88 | 602.92 | 125.00 |
| 29. Extraordinary repairs: | | | | | |
| (a) Hull. | 2,195.52 | | | 338.52 | \$ 2,510.41 |
| (b) Machinery. | | | | | |
| 30. Alterations and additions: | | | | | |
| (a) Hull. | | 27.26 | | | |
| (b) Machinery. | | | | | |
| 31. Laundry, ice, and miscellaneous expenses. | 30.50 | 1,669.23 | 3.96 | 30.00 | 15.00 |
| 32. Office expenses. | | 378.88 | | | |
| Total. | \$6,772.13 | \$12,335.09 | \$381.46 | \$17,826.47 | \$6,458.73 |

TABLE XVI.—Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name. | Hittases. | Hyechn. | Ile de Bois. | Inaqueue. | Hases. |
|--|---|--|---|--|---|
| OPERATING COST—Contd. | | | | | |
| 34. Cost of coal per long ton. | \$2.15 | \$1.142 | \$2.10 | \$3 | \$2.50. |
| 35. Cost of oil per gallon. | 47½ cents | \$0.163 | | 30 to 60 cents | Kerosene, \$0.08 to \$0.10; lubricating, \$0.33 to \$0.60. |
| 36. By whom and when repairs were made. | U. S. Engineer Department. | Morgan City Shipyard & Drydock Co. and crew of boat. | U. S. Engineer depot | U. S. fleet, Vicksburg, Miss. | (1). |
| 37. Days under steam. | 244 | See Remarks. | 125 | 195 | 175. |
| 38. Remarks on work done by towboat during year. | <p><i>Remarks.</i></p> <p>Sale Creek, Washington, Hazleridge, and Dallas Shoals, Tennessee River.</p> | <p><i>Remarks.</i></p> <p>Working in conjunction with snagboat Pigeon removed obstructions in Bayou Nezpique, Des Caines, Plaquemine Brule; schooner Bayou and Vermilion River, removing 160 snags and 166 trees; towing dredge Grossetete from Plaquemine to Bayou Feche; towing snagboat Pigeon from Abbeville to Keystone Lock and return to Abbeville; used on inspections and surveys of Vermilion River, Intracoastal Waterway, Mergentau River, Bayou Plaquemine, Grand River, and Atchafalaya River; inspection of bridges on Bayou Black and waterways from Plaquemine to St. Martinville and return to New Orleans. Transporting material from Abbeville to schooner Bayou Lock for lockhouse construction; destroying hydrant at Bayou Brule; Bayou Chavall; Bayou Lacessine, Plaquemine Brule, Queue de Tortue, Des Caines, Mergentau.</p> | <p><i>Remarks.</i></p> <p>Mississippi River between mouth of Ohio and Missouri Rivers. Attached to dredge Fort Chartres and engaged in sounding, placing buoys, carrying mail, towing, etc.</p> | <p><i>Remarks.</i></p> <p>(1) Operated 56 days with single crew and 129 days with double crew, towing revayment material, 9,133 miles with tow; 2,710 miles light.</p> | <p><i>Remarks.</i></p> <p>Harbor work, fleet tender, Memphis, Tenn.</p> |

ten Elvers, Bayou Black, Bayous Fagundes and Griseaud, Choctaw Bayou, and Bayou Teche, and Var-millon River; repacking hydraulic booms in Bayous Black, Chasse, and Teche.

Mixed 405,013 pounds of sol-nol using 22,568 pounds of areane and 25,600 pounds of soda, 4,670,180 square yards of hydraulic dikes were destroyed with this solution.

1 Fuel oil.

TABLE XVI.—Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name..... | John. | Jupiter. | Kaskaskia. | Ketch, George G. | King, Col. W. R. |
|--|------------------------------|---|-------------------------------|------------------------------------|--|
| 2. District..... | Nashville, Tenn. | St. Louis, Mo., Mississippi River Commission. | St. Louis, Mo. | Kansas City, Mo. | Chattanooga, Tenn. |
| 3. Where built..... | Jeffersonville, Ind. | Jeffersonville, Ind. | Jeffersonville, Ind. | Gasconade, Mo. | Muscle Shoals Canal, Ala. |
| 4. When built..... | 1903. | 1912. | 1900. | 1914. | 1896; rebuilt in 1910 by United States. |
| 5. Builder..... | Ed. J. Howard. | Ed. J. Howard. | Ed. J. Howard. | United States. | United States. |
| 6. Time to build..... | 3 months. | 9 months. | 14 months. | 6 months. | |
| 7. Where purchased..... | | | | | |
| 8. When purchased..... | | | | | |
| 9. From whom purchased..... | | | | | |
| 10. Purchase price..... | Wood. | Steel. | Steel. | Wood. | Wood. |
| 11. Material of hull..... | do. | Wood. | Wood. | do. | Do. |
| 12. Material of house..... | \$4,535. | \$17,175. | \$18,150. | \$14,781.51. | \$600. |
| 13. Contract cost..... | \$100. | \$1,120.50. | \$1,120.50. | \$1,050. | \$1,247. |
| 14. Cost of outfit..... | \$3,120. | \$14,500. | \$7,250. | \$13,000. | |
| 15. Present value..... | | | | | |
| 16. Hull: | | | | | |
| (a) Length over all..... | 100 feet 6 inches. | 118 feet. | 118 feet 3 inches. | 137 feet 8 inches. | 78 feet. |
| (b) Length on water line..... | 85 feet. | 96 feet. | 100 feet. | 105 feet 6 inches. | 65 feet. |
| (c) Length of hull..... | 87 feet 2 inches. | 99 feet. | 102 feet. | 110 feet. | 98 feet. |
| (d) Beam over all..... | 18 feet 9 inches. | 23 feet. | 25 feet. | 22 feet 9 inches. | 15 feet 8 inches. |
| (e) Beam on water line..... | 18 feet 4 inches. | 20 feet. | 23 feet 4 inches. | 21 feet 6 inches. | 13 feet 8 inches. |
| (f) Molded depth amidship..... | 3 feet 3 inches. | 4 feet 6 inches. | 4 feet 3 inches. | 4 feet. | 3 feet 6 inches. |
| (g) Draft forward..... | 1 foot 6 inches. | 3 feet 3 inches. | 3 feet 9 inches. | 10 inches (light). | 2 feet 2 inches. |
| (h) Draft aft..... | 1 foot 1 inch. | 2 feet 9 inches. | 3 feet 9 inches. | 1 foot 10 inches (light). | 2 feet 2 inches. |
| (i) Displacement (long tons). | 32. | 130. | 180. | 94. | 37. |
| 17. Engines: | | | | | |
| (a) Number and type of propelling engines. | 2 slide valve link motion. | 1 pair horizontal high pressure. | 2 Mississippi River. | 2 high pressure (Gillett & Eskom). | 2 slide valve Lidgetwood hoisting engines. |
| (b) Diameter and stroke. | 7½ inches by 32-inch stroke. | 9½ inches by 5 feet. | 12 inches by 5-foot stroke. | 9 by 24 inches. | 7 by 10 inches. |
| (c) Revolutions per minute, light. | 35. | 26. | 25. | 28. | 235. |
| (d) Revolutions per minute, towing. | 28. | 22. | 20. | 25. | 240. |
| 18. Paddle wheel: | | | | | |
| (a) Diameter..... | 10 feet. | 15 feet. | 13 feet. | 14 feet. | 9 feet 4 inches. |
| (b) Number of blades..... | 12. | 13. | 11. | 13. | 11. |
| (c) Length and width of bucket, etc. | 12 feet by 18 inches. | 13 feet by 20 inches. | 17 feet long, 28 inches wide. | 14 feet by 20 inches. | 10 feet 6 inches long, 14 inches wide. |

| (d) Diameter of shaft. | 4 inches. | 5 1/2 inches. | 7 inches. | 8 inches. | 4 inches. |
|--|---------------------------------|---|-----------------------------------|------------------|--|
| | 3. | 4. | 4. | 4. | 3. |
| 19. BOLLERS: | | | | | |
| (a) Number and type. | 1 Scotch marine. | 2 cylindrical flue. | 1 Mississippi River. | 1 Scotch marine. | 1 locomotive. |
| (b) Dimensions. | 42 inches by 14 feet 10 inches. | 42 inches by 9 feet 6 inches. | 42 inches diameter, 24 feet long. | 14 by 5 feet. | 39 inches diameter, 14 feet 6 inches long. |
| (c) Number and diameter of flues in one boiler. | 42 3-inch flues. | 36 of 2 1/2 inches, 2 of 4 1/2 inches diameter. | 2, 11 inches; 2, 9 1/2 inches. | 52, 3 inches. | 40, 3 inches diameter, 8 feet 6 inches long. |
| (d) Total heating surface. | 423 square feet. | 28 square feet. | 426 square feet. | 650 square feet. | 316 square feet. |
| (e) Total grate surface. | 12 square feet. | 28 square feet. | 20 square feet. | 15 square feet. | 11.25 square feet. |
| (f) Steam pressure. | 180 pounds. | 185 pounds. | 175 pounds. | 200 pounds. | 180 pounds. |
| 20. Speed in miles per hour (average of up and down stream speed). | 6 to 10. | 8.6. | 6. | 8. | 8. |
| 21. Towing capacity. | 1 100-foot barge. | 1 barge. | 800 tons. | 300 long tons. | 200 tons upstream 2 miles per hour. |
| 22. Number of men in crew. | 5. | 7. | 6. | 9. | 8. |
| OPERATING COST. | | | | | |
| 23. Pay roll. | \$2,385.32 | | \$774.33 | \$4,440.49 | \$3,711.00 |
| 24. Subsistence. | 406.49 | | 203.50 | 1,390.66 | 1,023.00 |
| 25. Supplies: | | | | | |
| (a) Engine room. | 36.96 | | 12.60 | 280.57 | 3.20 |
| (b) Boiler room. | 43.27 | | .88 | 28.33 | 3.20 |
| (c) Miscellaneous. | 664.01 | | 20.00 | 32.43 | 116.74 |
| 26. Coal. | | | 233.00 | 2,094.51 | 763.70 |
| 27. Oil: | | | | | |
| (a) Kerosene. | 6.75 | | 1.60 | 2.20 | 27.45 |
| (b) Lubricating. | 14.16 | | 7.35 | 28.75 | 106.75 |
| 28. Ordinary repairs: | | | | | |
| (a) Hull. | | | | | |
| (b) Machinery. | | | | | |
| 29. Extraordinary repairs: | | | | | |
| (a) Hull. | | \$510.21 | 249.29 | 577.71 | 646.05 |
| (b) Machinery. | 1,153.68 | 431.46 | 410.51 | 264.30 | 863.54 |
| 30. Alterations and additions: | | | | | |
| (a) Hull. | | | | | |
| (b) Machinery. | | | | | |
| 31. Laundry, ice, and miscellaneous expenses. | | | 10.43 | 4.20 | 43.00 |
| 32. Office expenses. | | | | 289.68 | |
| 33. Total. | \$4,599.79 | \$1,041.66 | \$1,940.43 | \$9,944.15 | \$7,947.33 |

TABLE XVI.—Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name..... | John. | Jupiter. | Keesbitt. | Kath, George G. | King, Col. W. E. |
|--|----------------------------|-----------------------------------|---|---|--|
| OPERATING COST—contd. | | | | | |
| 34. Cost of coal per long ton..... | \$2.75..... | ..... | \$2.35..... | \$3.63 (average)..... | \$2.425..... |
| 35. Cost of oil per gallon..... | \$0.20..... | ..... | ..... | 40 cents..... | 37½ cents..... |
| 36. By whom and when repairs were made..... | ..... | United States during year..... | U. S. Engineer Depot..... | United States; during season..... | U. S. Engineer Department..... |
| 37. Days under steam..... | 206..... | ..... | 102..... | 222..... | 353..... |
| 38. Remarks on work done by towboat during year..... | Towing at Lock C, etc..... | ..... | Towing for construction work..... | Towing plant and materials for improvement work..... | Operated 6,180 miles..... |
| | | Remarks.
Not used during year. | Remarks.
Mississippi River between mouths of Ohio and Missouri Rivers. | Remarks.
Operated on Missouri River (Atkinson, Kans., to mouth). | Remarks.
Kogers Island and Tuscumbia Bar, Tenn. |

FLOATING PLANT.

4471

| 1. Name..... | King, Wm. R. | Engineering. | Lafayette. | Le Chaire. | Notes. |
|--|------------------------------|--|--|---|---|
| 2. District..... | St. Louis, Mo. | Pittsburgh, Pa. | New Orleans (Fourth Missis-
sippi River). | Rock Island, Ill. | Montgomery, Ala. |
| 3. Where built..... | Jeffersonville, Ind. | Hull, Albany, Ind.; cabin,
Lock 4, Pa. | New Orleans, La. | Grafton, Ill. | Gadsden, Ala.; rebuilt at
Lock 4, Ala. |
| 4. When built..... | 1899 | 1915 | 1911 | 1914-15 | 1888; rebuilt 1903. |
| 5. Builder..... | Ed. J. Howard | Hull, Chas. Hegewald Co.;
cabin, United States. | Johnson Iron Works (Ltd.) | Ed. J. Howard and United
States. | No record; rebuilt by U. S.
Engineer Department. |
| 6. Time to build..... | 13 months | 8 months | 12 months | 10 months | No record. |
| 7. Where purchased..... | | | | | Gadsden, Ala. |
| 8. When purchased..... | | | | | 1902 |
| 9. From whom purchased..... | | | | | \$6,000. |
| 10. Purchase price..... | | Steel (\$8,900) | Steel | Steel | Wood |
| 11. Material of hull..... | | Wood | Wood | Wood, poplar | Do. |
| 12. Material of house..... | | \$29,530 | \$39,000 | Total cost, \$44,238.10 | \$14,000 as rebuilt. |
| 13. Contract cost..... | | \$67,700 | \$1,066.01 | \$86,072.96 | \$11,950. |
| 14. Cost of outfit..... | | \$4,250 | \$33,200 | | |
| 15. Present value..... | | \$41,000 | | | |
| 16. Hull:
(a) Length over all..... | 218 feet 10 inches | 118 feet | 136 feet | 144 feet 10 inches | 137 feet |
| (b) Length on water
line..... | 186 feet 6 inches | 95 feet | 133 feet | 132 feet | 136 feet |
| (c) Length of hull..... | 190 feet | 100 feet | 116 feet | 136 feet 4 inches | 137 feet |
| (d) Beam over all..... | 41 feet | 20 feet | 20 feet 6 inches | 34 feet 8 inches | 27 feet 8 inches |
| (e) Beam on water
line..... | do. | do. | 27 feet 10 inches | 31 feet | 23 feet |
| (f) Molded depth
amidship..... | 5 feet 3 inches | 3 feet 6 inches | 5 feet 6 inches | 4.1 feet | 4 feet 6 inches |
| (g) Draft forward..... | 4 feet 6 inches | 3 feet | 3 feet 10 inches | 3 feet | 2 feet 2 inches |
| (h) Draft aft..... | 4 feet 5 inches | 2 feet 7 inches | 3 feet 11 inches | 2 feet 10 inches | 2 feet 3 inches |
| (i) Displacement
(long tons)..... | 716 | 185 | 300 | 264 | 167 |
| 17. Engines:
(a) Number and
type of pro-
pelling engines..... | 2 Mississippi River | 2 poppet valve California
cut-off type. | 2 tandem compound | 2 tandem compound poppet
valve California cut-off. | 2 long stroke, high pressure,
slide valves. |
| (b) Diameter and
stroke..... | 24 inches by 10-foot stroke. | 10 inches diameter by 8 foot
6 inch stroke. | 12 and 26 by 72 inches | 9 by 18 inches by 6 feet | 10 inches diameter, 4-foot
stroke. |
| (c) Revolutions per
minute, light..... | 18 | 21 | 16 | 25 | 22 |
| (d) Revolutions per
minute, towing..... | 12 | 13 | 16 | 14-20 | 18 |

TABLE XVI.—*Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.*

| 1. Name..... | John. | Jupiter. | Keshishie. | Kath, George G. | Kings, Col. W. E. |
|--|----------------------------|-----------------------------------|---|--|--|
| OPERATING COST—Contd. | | | | | |
| 34. Cost of coal per long ton..... | \$2.75..... | | \$2.35..... | \$3.83 (average)..... | \$2.425..... |
| 35. Cost of oil per gallon..... | \$0.20..... | | | 40 cents..... | 27½ cents..... |
| 36. By whom and when repairs were made..... | | United States during year..... | U. S. Engineer Depot..... | United States; during season..... | U. S. Engineer Department..... |
| 37. Days under steam..... | 206..... | | 102..... | 282..... | 353..... |
| 38. Remarks on work done by towboat during year..... | Towing at Lock C, etc..... | | Towing for construction work..... | Towing plant and materials for improvement work..... | Operated 6,180 miles..... |
| | | Remarks.
Not used during year. | Remarks.
Mississippi River between mouths of Ohio and Missouri Rivers. | Remarks.
Operated on Missouri River (Atchafalaya, Kans., to mouth). | Remarks.
Kogers Island and Tuscumbia Bar, Tenn. |

FLOATING PLANT.

4471

| 1. Name..... | King, Wm. R. | Klauswing. | Lafourche. | Le Chaire. | Leche. |
|--|----------------------------------|--|--|---|---|
| 2. District..... | St. Louis, Mo..... | Pittsburgh, Pa..... | New Orleans (Fourth Missis-
sippi River)..... | Rock Island, Ill..... | Montgomery, Ala. |
| 3. Where built..... | Jeffersonville, Ind..... | Hull, Albany, Ind.; cabin,
Lock 4, Pa..... | New Orleans, La..... | Grafton, Ill..... | Gadsden, Ala.; rebuilt at
Lock 4, Ala. |
| 4. When built..... | 1899..... | 1915..... | 1911..... | 1914-15..... | 1898; rebuilt 1903. |
| 5. Builder..... | Ed. J. Howard..... | Hull, Chas. Hegevald Co.;
cabin, United States..... | Johnston Iron Works (Ltd.)..... | Ed. J. Howard and United
States..... | No record; rebuilt by U. S.
Engineer Department. |
| 6. Time to build..... | 13 months..... | 8 months..... | 12 months..... | 10 months..... | No record. |
| 7. When purchased..... | | | | | Gadsden, Ala.
1892. |
| 8. From whom purchased..... | | | | | \$6,000.
Wood. |
| 9. Purchase price..... | ..... | Steel (\$3,900)..... | Steel..... | Steel..... | Do. |
| 10. Material of hull..... | ..... | Wood..... | Wood..... | Wood, poplar..... | \$14,000 as rebuilt. |
| 11. Material of house..... | ..... | \$29,530..... | \$39,000..... | Total cost, \$44,238.10..... | \$11,250. |
| 12. Contract cost..... | ..... | \$1,760..... | \$1,066.01..... | \$30,672.98..... | 137 feet. |
| 13. Cost of outfit..... | ..... | \$4,250..... | \$33,200..... | 144 feet 10 inches..... | 27 feet 8 inches. |
| 14. Cost of outfit..... | ..... | \$41,000..... | 126 feet..... | 132 feet..... | 23 feet. |
| 15. Present value..... | ..... | 118 feet..... | 116 feet..... | 3 feet..... | 4 feet 6 inches. |
| 16. Hull:
(a) Length over all..... | 218 feet 10 inches..... | 95 feet..... | 20 feet 6 inches..... | 2 feet 10 inches..... | 2 feet 2 inches. |
| (b) Length on water
line..... | 186 feet 6 inches..... | 100 feet..... | 27 feet 10 inches..... | 2 feet 8 inches..... | 2 feet 3 inches. |
| (c) Length of hull..... | 190 feet..... | 20 feet..... | 5 feet 6 inches..... | 3 feet..... | 167. |
| (d) Beam over all..... | 41 feet..... | 40..... | 3 feet 10 inches..... | 2 feet 10 inches..... | 10 inches diameter, 4-foot
stroke. |
| (e) Beam on water
line..... | do..... | do..... | 8 feet 11 inches..... | 254..... | 22. |
| (f) Molded depth
amidships..... | 5 feet 3 inches..... | 3 feet 6 inches..... | 300..... | 2 tandem compound poppet
valve California cut-off..... | 18. |
| (g) Draft forward..... | 4 feet 6 inches..... | 3 feet..... | 2 tandem compound..... | 12 and 26 by 72 inches..... | |
| (h) Draft aft..... | 4 feet 5 inches..... | 2 feet 7 inches..... | 12 and 26 by 72 inches..... | 18..... | |
| (i) Displacement
(long tons)..... | 716..... | 125..... | 10 inches diameter by 8 foot
6 inch stroke..... | 16..... | |
| 17. Engines:
(a) Number and
type of pro-
pelling engines..... | 2 Mississippi River..... | 2 poppet valve California
cut-off type..... | 21..... | 14-20..... | |
| (b) Diameter and
stroke..... | 24 inches by 10-foot stroke..... | 10 inches diameter by 8 foot
6 inch stroke..... | 13..... | | |
| (c) Revolutions per
minute, light..... | 18..... | 21..... | 16..... | | |
| (d) Revolutions per
minute, towing..... | 12..... | 13..... | | | |

TABLE XVI.—Report of operations of tug and survey boats (paddle-steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name..... | King, Wm. R. | Kittanning. | Lafayette. | Le Claire. | Leona. |
|---|--|---|---|--|---|
| 18. Paddle wheel:
(a) Diameter.....
(b) Number of
hubs.....
(c) Length and
width of
hubs.....
(d) Diameter of shaft
.....
(e) Number of
hubs..... | 22 feet.....
18.....
27 feet by 28 inches (includes
5-inch open space). | 13 feet.....
11.....
14 feet 4 inches by 1 foot 10
inches.....
5 inches.....
4..... | 18 feet.....
14.....
18 feet 4 inches by 24 inches.....
9 inches.....
5..... | 15 feet.....
16.....
20 feet long, 26 inches wide.....
8 inches.....
5..... | 14 feet 6 inches.....
12.....
13 feet by 16 inches.....
4..... |
| 19. Boilers:
(a) Number and
type.....
(b) Dimensions.....
(c) Number and di-
ameter of flue
sheet.....
(d) Total heating
surface.....
(e) Total grate sur-
face.....
(f) Steam pressure.....
(g) Speed in miles per hour
(average of up and
down stream speed). | 6 Mississippi River.....
42 inches diameter; 24 feet
long.....
4; two 11-inch; two 9-inch.....
2,800 square feet.....
110 square feet.....
175 pounds.....
7.....
3,000 tons.....
32..... | 2 flue.....
16 feet 3 inches long by 36;
inches diameter.....
2 of 13 inches diameter by 16
feet 3 inches long.....
284 square feet.....
34.4 square feet.....
247 pounds.....
8.....
Two 42-horsepower engines.....
6..... | 3 Mississippi River type.....
18 feet long; 44 inches diam-
eter.....
2 of 12 inches; 4 of 7 inches.....
1,140.80 square feet.....
49 square feet.....
171 pounds.....
9.....
2,000 tons upstream.....
15 single, 30 double..... | 1 internal furnace, dryback,
Scottish marine.....
8 feet diameter; 16 feet long.....
72; 4 inches.....
1,216 square feet.....
33 square feet.....
200 pounds.....
8-10.....
400 tons.....
11..... | 2 western river steamboat,
return tubular.....
38 inches by 22 feet.....
500 square feet.....
99 square feet.....
126 pounds.....
5.....
7 barges.....
6..... |
| 20. Towing capacity.....
21. Number of men in crew..... | 3,000 tons.....
32..... | Two 42-horsepower engines.....
6..... | 2,000 tons upstream.....
15 single, 30 double..... | 400 tons.....
11..... | 7 barges.....
6..... |
| OPERATING COST. | | | | | |
| 22. Pay roll..... | \$4,387.30 | \$3,358.23 | \$2,987.01 | \$2,395.02 | \$1,290.33 |
| 23. Subistence..... | 1,880.16 | 848.59 | 808.50 | 797.98 | 545.50 |
| 24. Supplies:
(a) Engine room.....
(b) Pilot room.....
(c) Miscellaneous..... | 85.31
145.00
2,880.00 | 65.66
68.55
1,060.94 | 45.00
3.85
4,196.50 | 24.10
7.10
189.94
1,300.75 | 46.96
1.90
46.91
310.84 |
| 25. Oil:
(a) Kerosene.....
(b) Lubricating.....
(c) Ordinary repairs.....
(d) Miscellaneous..... | 4.07
87.86
597.18
1,562.43 | 4.08
46.11
51.56
75.75 | 7.00
63.00
210.00
874.00 | 13.26
26.53
1,400.24 | 13.11
40.87
7.25 |

[illegible]

TABLE XVI.—Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name..... | Louis. | Louis, Miss. | Lookout. | Louis. | Louis. |
|--|---|---|--------------------------------------|--|--|
| 2. District..... | St. Louis, Mo., Mississippi River Commission. | Kansas City, Mo. | Chattanooga, Tenn. | Rock Island, Ill. | Rock Island, Ill. |
| 3. Where built..... | Dubuque, Iowa. | Dubuque, Iowa. | Jeffersonville, Ind. | Keokuk, Iowa. | Keokuk, Iowa. |
| 4. When built..... | 1899. | 1911. | 1899; rebuilt 1910 by United States. | 1884. | 1888. |
| 5. Builder..... | Iowa Iron Works (Ltd.) | Dubuque Boat & Boiler Works. | E. J. Howard. | United States (Des Moines Rapids Canal Shops). | United States (Des Moines Rapids Canal Shops). |
| 6. Time to build..... | 15 months. | 10 months. | Not known. | 8 months. | 9 months. |
| 7. When purchased..... | 1911. | Dubuque, Iowa. | Jeffersonville, Ind. | | |
| 8. From whom purchased..... | | Dubuque Boat & Boiler Works. | E. J. Howard. | | |
| 10. Purchase price..... | Steel. | Steel. | Wood. | | Oak. |
| 11. Material of hull..... | Steel. | Steel. | Wood. | \$2,474. | |
| 12. Material of house..... | Wood. | Wood. | do. | Steel since 1905; originally wood. | Pine. |
| 13. Contract cost..... | \$45,672. | \$34,588.70. | do. | | \$4,000 (including outfit). |
| 14. Cost of outfit..... | | \$1,853.35. | \$9,000. | | |
| 15. Present value..... | \$18,100. | \$1,853.35. | \$3,600. | | \$2,368.26. |
| 16. Hull..... | | \$24,200. | \$6,764. | | |
| (a) Length over all..... | 199 feet 4 inches. | 126 feet. | 137 feet 8 inches. | 78 feet. | 78 feet. |
| (b) Length on water line..... | 167 feet 4 inches. | 114 feet 6 inches. | 114 feet. | 65 feet. | 65 feet. |
| (c) Length of hull..... | 171 feet 6 inches. | 116 feet. | 118 feet. | 67 feet. | 67 feet. |
| (d) Beam over all..... | 37 feet 8 inches. | 25 feet 6 inches. | 25 feet 7 inches. | 15 feet 8 inches. | 15 feet. |
| (e) Beam on water line..... | 36 feet. | 25 feet 4 inches. | 25 feet 2 inches. | 12 feet 2 inches. | 12 feet. |
| (f) Molded depth amidship..... | 5 feet 6 inches. | 5 feet. | 4 feet 4 inches. | 3 feet 6 inches. | 3 feet. |
| (g) Draft forward..... | 4 feet. | 3 feet 10 inches. | 3 feet 3 inches. | 2 feet 6 inches. | 2 feet. |
| (h) Draft at..... | 4 feet 7 inches. | 3 feet 21 inches. | 2 feet 8 inches. | 2 feet. | 2 feet. |
| (i) Displacement..... | 560. | 191. | 160. | 41.6. | 31. |
| 17. Engines..... | | | | | |
| (a) Number and type of propellers..... | 1 pair, horizontal high pressure. | 2 cross-compound..... | 2 high-pressure piston valve. | 2 noncondensing high-pressure. | 2 slide valve. |
| (b) Diameter and stroke..... | 22 inches by 8 feet. | High pressure, 13 inches; low pressure, 26 inches; at r.p.m., 5 feet. | 10 inches by 5 feet. | 6 by 43 inches. | 6 inches diameter by 42-inch stroke. |
| (c) Revolutions per minute..... | 15. | 26. | 27. | 35. | 32. |
| (d) Horsepower, net..... | 11. | 19. | 31. | 94. | 94. |

| | 24 feet by 34 inches.
12 inches.
5..... | 15 feet 2 inches by 24 inches.
7½ inches.
4..... | 18 feet by 22 inches.
6 inches.
4..... | 9 feet long, 16 inches wide...
4 inches.
3..... | 9 feet by 15 inches.
4 inches.
3..... |
|--|---|--|---|---|---|
| | | | | | |
| 19. Bollers: | | | | | |
| (a) N um ber and type..... | 6; cylindrical, flue..... | 2; Mississipp River..... | 2; marine..... | 1; horizontal, externally fired..... | 1; horizontal tubular..... |
| (b) Dimensions..... | 38 inches by 30 feet..... | 43 inches by 20 feet..... | 38 inches by 22 feet..... | 10 feet long, 38 inches diameter..... | 10 feet by 38 inches diameter..... |
| (c) N um ber and diameter of flues in one boiler..... | 2 of 13 inches diameter..... | 10; 6 inches..... | 6; 6 inches..... | 26 of 3 inches diameter..... | 26 of 3 inches diameter..... |
| (d) Total heating surface..... | 2,472 square feet..... | 930 square feet..... | 637 square feet..... | 271 square feet..... | 234 square feet..... |
| (e) Total grate surface..... | 99 square feet..... | 92 square feet..... | 34 square feet..... | 15 square feet..... | 18 square feet..... |
| (f) Steam pressure..... | 160 pounds..... | 180 pounds..... | 196 pounds..... | 198 pounds..... | 190 pounds..... |
| 20. Speed in miles per hour (average of up and down stream speed)..... | 12..... | 9..... | 8 miles upstream and 12 miles downstream..... | 9..... | 8..... |
| 21. Towing capacity..... | 6 barges..... | 5 barges; 625 tons cargo..... | 1,000 tons; 2-mile speed upstream..... | 300-ton tow; 2½ miles per hour upstream..... | 1 barge, 110 by 24 feet, with 160-ton load..... |
| 22. Number of men in crew..... | 14..... | 9..... | 10 single crew, 16 double crew..... | 5..... | 6..... |
| OPERATING COST. | | | | | |
| 23. Pay roll..... | \$2,280.07..... | \$5,917.08..... | \$7,453.00..... | \$1,493.77..... | \$1,233.02..... |
| 24. Subsistence..... | 1,217.36..... | 1,461.68..... | 1,991.55..... | 464.81..... | 401.96..... |
| 25. Supplies: | | | | | |
| (a) Engine room..... | 228.12..... | 104.03..... | 34.00..... | 4.86..... | 14.00..... |
| (b) Boiler room..... | ..... | 20.85..... | 8.10..... | 14.53..... | 7.30..... |
| (c) Miscellaneous..... | 1,719.98..... | 241.39..... | 187.53..... | 91..... | 5.85..... |
| 26. Coal..... | ..... | 4,039.65..... | 2,647.70..... | 641.47..... | 275.39..... |
| 27. Oil: | | | | | |
| (a) Kerosene..... | Included in 25..... | 7.60..... | 35.05..... | 1.34..... | 2.00..... |
| (b) Lubricating..... | ..... | 106.12..... | 186.80..... | 5.43..... | 8.40..... |
| 28. Ordinary repairs: | | | | | |
| (a) Hull..... | 326.84..... | 47.72..... | 2,373.48..... | 101.59..... | 294.90..... |
| (b) Machinery..... | 1,857.80..... | 140.07..... | 1,144.17..... | 103.40..... | 75.36..... |
| 29. Extraordinary repairs: | | | | | |
| (a) Hull..... | ..... | 1,383.83..... | ..... | ..... | ..... |
| (b) Machinery..... | ..... | 81.04..... | ..... | ..... | ..... |

TABLE XVI.—Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name..... | Leola. | Leola, Lieut. | Lookout. | Leola. | Leola. |
|--|---|---|---|--|---|
| OPERATING COST—contd. | | | | | |
| 30. Alterations and additions: | | | | | |
| (a) Hull..... | | | | | \$422.85 |
| (b) Machinery..... | | \$92.65 | \$182.90 | \$18.50 | 14.00 |
| 31. Laundry, ice, and miscellaneous expense..... | | 367.75 | 30.00 | | |
| 32. Office expenses..... | | | | | |
| 33. Total..... | \$7,108.62 | \$13,990.01 | \$2.44 | \$2,860.61 | \$2,839. |
| 34. Cost of coal per long ton..... | \$2.50 to \$5. | \$2.88 (average). | \$17,204.28 | | \$2,844.83 |
| 35. Cost of oil per gallon..... | | 20 cents. | 47½ cents. | Cylinder, 23 cents; engine, 21 cents; kerosene, 6.7 cents. | Kerosene, 6 cents; lubricating, 22 cents. |
| 36. By whom and when repairs were made..... | Fowler Wolf Sheet Metal Works and United States, during year. | United States, during season. | U. S. Engineer Department. | United States, during year. | United States in winter and as needed during season. |
| 37. Days under steam..... | 44. | 316. | 325. | 138. | 140. |
| 38. Remarks on work done by towboat during year..... | See Remarks.

Ohio River as tender to dredge Zeta. Forward sheet in each boiler replaced. | Towing plant and materials for improvement works.

Operated on the Missouri River (Kansas City to mouth). | Operated 6,677 miles.

Kogers Island and Tusculumba Bar, Tennessee River. | Remarks.

Subdivision Wisconsin River to Le Claire. Towing material in connection with upper Mississippi River improvement. Tending suction dredge and Lighthouse Service. | Remarks.

Tending dredges, towing material for building dams and shore protection, and putting out and taking in buoys; division, Burlington to Hannibal. |

| 2. District. | Rock Island, Ill. | Rock Island, Ill. | St. Louis, Mo., Mississippi River Commission. | Mississippi River, first and second districts, Memphis, Tenn. | Chattanooga, Tenn. |
|--|----------------------|-------------------------|---|---|---|
| 3. Where built. | do. | Dry dock, Keokuk, Iowa. | Jedersonville, Ind. | Unknown. | Nashville, Tenn. |
| 4. When built. | 1891. | 1893. | 1899. | do. | 1883; rebuilt in 1912 by United States. |
| 5. Builder. | Kahle Bros. | United States. | M. A. Sweeney Co. | do. | Ryman Line Co. |
| 6. Time to build. | Not known. | 9 months. | 13 months. | do. | Unknown. |
| 7. Where purchased. | Rock Island, Ill. | do. | do. | Leased. | Nashville, Tenn. |
| 8. When purchased. | 1893. | do. | do. | do. | 1888. |
| 9. From whom purchased. | John Streokitus. | do. | do. | do. | Ryman Line Co. |
| 10. Purchase price. | \$2,500. | Wood. | Steel. | Lease price, \$3.33 per day. | \$3,300. |
| 11. Material of hull. | Wood. | \$6,500. | Wood. | Wood. | \$1,000. |
| 12. Material of house. | do. | \$3,735.32. | \$400. | do. | Wood. |
| 13. Contract cost. | \$593. | 88 feet. | \$5,100. | do. | \$9,444. |
| 14. Cost of outfit. | \$3,470.01. | 73 feet. | 94 feet 6 inches. | do. | 115 feet. |
| 15. Present value. | 85 feet. | 75 feet 3 inches. | 78 feet 3 inches. | do. | 95 feet. |
| 16. Hull: | | | | | |
| (a) Length over all line. | 70.5 feet. | 75 feet. | 80 feet. | 24 feet 2 inches. | 100 feet. |
| (b) Length on water line. | do. | 19 feet 8 inches. | 18 feet 4 inches. | do. | 22 feet 6 inches. |
| (c) Length of hull. | 18.5 feet. | 18 feet. | 17 feet. | do. | 20 feet 6 inches. |
| (d) Beam over all. | 16 feet. | 3 feet. | 3 feet 9 inches. | 4 feet 4 inches. | 3 feet 6 inches. |
| (e) Beam on water line. | 3 feet 3 inches. | 1 foot 11 inches. | 3 feet 1 inch. | 2 feet. | 2 feet 8 inches. |
| (f) Molded depth amidship. | 3 feet 3 inches. | 2 feet 2 inches. | 2 feet 8 inches. | 2 feet 6 inches. | 2 feet 8 inches. |
| (g) Draught forward. | 36. | 54. | 83. | 83 gross tons. | 137. |
| (h) Draught aft. | do. | do. | do. | do. | do. |
| (i) Displacement (long tons). | do. | do. | do. | do. | do. |
| 17. Engines: | | | | | |
| (a) Number and type of propelling engines. | 2-lever. | 2-lever. | 1 pair; horizontal high pressure. | 2 Mississippi River type, high pressure poppet valve, California cut-off. | 2-elite valve. |
| (b) Diameter and stroke. | 7 inches; 36 inches. | 7 inches; 48 inches. | 81 inches by 4 feet. | 10 inches by 8 feet. | 81 inches diameter by 3-foot stroke. |
| (c) Revolutions per minute, light. | 28. | 22. | 24. | 23. | 20. |
| (d) Revolutions per minute, towing. | 22. | 12. | 20. | 19. | 26. |

TABLE XVI.—*Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.*

| 1. Name..... | Mac. | | Marion. | | Merr. | | Kilgore, Mendota. | | McPherson. | |
|--|----------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| | | | | | | | | | | |
| 18. Paddle wheel: | | | | | | | | | | |
| (a) Diameter..... | 9.5 feet. | 10 feet 8 inches. | 12 feet. | 12 feet. | 12 feet. | 12 feet. | 12 feet. | 12 feet. | 10 feet 6 inches. | 10. |
| (b) Number of buckets..... | 13. | 13. | 13. | 13. | 13. | 13. | 13. | 13. | 10. | 10. |
| (c) Length and width of buckets..... | 9.3 feet by 18 inches. | 10 feet 3 inches, 19 inches. | 11 feet 8 inches by 18 inches. | 11 feet 8 inches by 18 inches. | 11 feet 8 inches by 18 inches. | 11 feet 8 inches by 18 inches. | 11 feet 8 inches by 18 inches. | 11 feet 8 inches by 18 inches. | 14 feet 2 inches long by 18 inches. | 14 feet 2 inches long by 18 inches. |
| (d) Diameter of shaft..... | 4 inches. | 4 inches. | 4 inches. | 4 inches. | 4 inches. | 4 inches. | 4 inches. | 4 inches. | 5 inches. | 5 inches. |
| (e) Number of wheel flanges..... | 3. | 3. | 3. | 3. | 3. | 3. | 3. | 3. | 5. | 5. |
| 19. Boilers: | | | | | | | | | | |
| (a) Number and type..... | 1 Mississippi River return flue. | 2 Mississippi River return flue. | 2 Mississippi River return flue. | 2 Mississippi River return flue. | 2 Mississippi River return flue. | 2 Mississippi River return flue. | 2 Mississippi River return flue. | 2 Mississippi River return flue. | 2 marine. | 2 marine. |
| (b) Dimensions..... | 3 by 14 feet. | 30 inches by 10 feet. | 30 inches by 10 feet. | 30 inches by 10 feet. | 30 inches by 10 feet. | 30 inches by 10 feet. | 30 inches by 10 feet. | 30 inches by 10 feet. | 34 inches diameter by 16 feet long. | 34 inches diameter by 16 feet long. |
| (c) Number and diameter of flues in boiler..... | 10 of 3½ inches; 3 of 4 inches. | 22; 24-inch. | 22; 24-inch. | 22; 24-inch. | 22; 24-inch. | 22; 24-inch. | 22; 24-inch. | 22; 24-inch. | 5; 6-inch. | 5; 6-inch. |
| (d) Total heating surface..... | 267 square feet. | 455 square feet. | 455 square feet. | 455 square feet. | 455 square feet. | 455 square feet. | 455 square feet. | 455 square feet. | 444 square feet. | 444 square feet. |
| (e) Total grate surface..... | 20 square feet. | 17 square feet. | 17 square feet. | 17 square feet. | 17 square feet. | 17 square feet. | 17 square feet. | 17 square feet. | 28 square feet. | 28 square feet. |
| (f) Steam pressure..... | 180 pounds. | 180 pounds. | 180 pounds. | 180 pounds. | 180 pounds. | 180 pounds. | 180 pounds. | 180 pounds. | 206 pounds. | 206 pounds. |
| 20. Speed in miles per hour (average of up and down stream speed)..... | 8.5. | 8. | 8. | 8. | 8. | 8. | 8. | 8. | 7. | 7. |
| 21. Towing capacity..... | 240 tons 2 miles an hour. | 260 tons 4 miles per hour in canal. | 260 tons 4 miles per hour in canal. | 260 tons 4 miles per hour in canal. | 260 tons 4 miles per hour in canal. | 260 tons 4 miles per hour in canal. | 260 tons 4 miles per hour in canal. | 260 tons 4 miles per hour in canal. | 400 tons. | 400 tons. |
| 22. Number of men in crew..... | 6. | 6. | 6. | 6. | 6. | 6. | 6. | 6. | 8 to each shift. | 8 to each shift. |
| OPERATING COST. | | | | | | | | | | |
| 23. Pay roll..... | \$2,170.16 | \$602.35 | \$602.35 | \$602.35 | \$602.35 | \$602.35 | \$602.35 | \$602.35 | \$1,160.09 | \$1,160.09 |
| 24. Subsistence..... | 640.00 | 222.76 | 222.76 | 222.76 | 222.76 | 222.76 | 222.76 | 222.76 | 340.50 | 340.50 |
| 25. Supplies: | | | | | | | | | | |
| (a) Engine room..... | 56.00 | .43 | .43 | .43 | .43 | .43 | .43 | .43 | 12.10 | 12.10 |
| (b) Boiler room..... | 150.00 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 15.00 | 15.00 |
| (c) Miscellaneous..... | 845.98 | 219.95 | 219.95 | 219.95 | 219.95 | 219.95 | 219.95 | 219.95 | 675.00 | 675.00 |
| 26. Coal..... | | | | | | | | | | |
| 27. Oil: | | | | | | | | | | |
| (a) Kerosene..... | | 1.02 | 1.02 | 1.02 | 1.02 | 1.02 | 1.02 | 1.02 | 12.00 | 12.00 |
| (b) Lubricating..... | | 3.88 | 3.88 | 3.88 | 3.88 | 3.88 | 3.88 | 3.88 | 17.67 | 17.67 |
| 28. Ordinary repairs..... | | 275.80 | 275.80 | 275.80 | 275.80 | 275.80 | 275.80 | 275.80 | 171.10 | 171.10 |
| (a) Fuel..... | | 171.10 | 171.10 | 171.10 | 171.10 | 171.10 | 171.10 | 171.10 | 26.00 | 26.00 |
| (b) Machinery..... | | | | | | | | | | |
| | \$2.10 | | | | | | | | | |

4479

18751—ENG 1917——283

TABLE XVI.—*Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—(continued).*

| 1. Name..... | Meramec. | Mercury. | Merrill. | Miami. | Minneapolis. |
|--|----------------------|--|---------------------------------|--------------------------------------|---|
| 2. District..... | St. Louis, Mo..... | St. Louis, Mo, Mississippi River Commission. | Second, Cincinnati. | First, Cincinnati, Ohio. | Rock Island, Ill. |
| 3. Where built..... | Jeffersonville, Ind. | Jeffersonville, Ind. | Jeffersonville, Ind. | Cincinnati, Ohio. | Grafton, Ill. |
| 4. When built..... | 1900. | 1899. | 1907-8. | 1912. | 1914-15. |
| 5. Builder..... | Ed. J. Howard. | M. A. Sweeney Co. | Howard Ship Yard Co. | The Charles Barnes Co. | Ed. J. Howard and United States. |
| 6. Time to build..... | 16 months. | 13 months. | 6 months. | 10 months. | 10 months. |
| 7. When purchased..... | | | | | |
| 8. When purchased..... | | | | | |
| 9. From whom purchased..... | | | | | |
| 10. Purchase price..... | | | | | |
| 11. Material of hull..... | Steel. | Steel. | Wood. | Steel and ingot iron. | Steel. |
| 12. Material of house..... | Wood. | Wood. | Wood. | Wood. | Wood. |
| 13. Contract price..... | \$18,150. | \$7,749. | \$14,000. | \$43,374. | \$44,066.30. |
| 14. Cost of outfit..... | \$1,120.50. | \$603. | \$1,479. | \$2,652.66. | \$36,475.74. |
| 15. Present value..... | \$8,150. | \$54,000. | \$7,140. | \$44,000. | |
| 16. Hull: | | | | | |
| (a) Length over all..... | 118 feet. | 94 feet 6 inches. | 131 feet 6 inches. | 157 feet 11 inches. | 144 feet 10 inches. |
| (b) Length on water line..... | 100 feet. | 78 feet 3 inches. | 112 feet. | 133 feet. | 122 feet. |
| (c) Length of hull..... | 102 feet. | 80 feet. | 115 feet. | 137.5 feet. | 125 feet 4 inches. |
| (d) Beam over all..... | 25 feet. | 18 feet 4 inches. | 23 feet. | 31 feet 1 inch. | 34 feet 8 inches. |
| (e) Beam on water line..... | 23 feet 4 inches. | 17 feet. | 21 feet 10 inches. | 30 feet. | 31 feet. |
| (f) Molded depth amidship..... | 4 feet 3 inches. | 3 feet 9 inches. | 3 feet 6 inches. | 4 feet 3 inches. | 4 feet 1 inch. |
| (g) Draft forward..... | 4 feet 3 inches. | 3 feet 1 inch. | 2 feet 10 inches. | 2 feet 5 inches. | 3 feet. |
| (h) Draft aft..... | 4 feet. | 2 feet 8 inches. | 2 feet 7 inches. | 2 feet 5 inches. | 2 feet 10 inches. |
| (i) Displacement (long tons). | 150. | 83. | 163. | 220. | 264. |
| 17. Engines: | | | | | |
| (a) Number and type of propulsion engines..... | 2 Mississippi River. | 1 pair, horizontal high pressure. | 2 high-pressure, puppet valves. | 2 noncondensing, California cut-off. | 2 tandem compound poppet valve, California cut-off. |
| (b) Diameter and stroke..... | 12 inches; 5 feet. | 8½ inches; 4 feet. | 11 inches; 5 feet. | 14 inches; 72 inches. | 9 and 18 inches; 6 feet. |
| (c) Revolutions per minute, light..... | 25. | 24. | 28. | 28. | 23. |
| (d) Revolutions per minute, towing..... | 20. | 20. | 24. | 23. | 14 to 20. |
| 18. Paddle wheels: | | | | | |
| (a) Diameter..... | 11 feet 5 inches. | 12 feet. | 15 feet. | 16 feet. | 16 feet. |
| (b) Number of buckets..... | 11. | 12. | 14. | 14. | 16. |

| WIDTH OF PUCK-
ETS. | 7 inches. | 4 1/2 inches. | 7 inches. | 8 inches. | 20 feet long by 26 inches wide. |
|--|--------------------------------------|--------------------------------------|---|--------------------------------------|---------------------------------|
| (d) Diameter of shaft. | 4. | 3. | 5. | 5. | |
| (e) Number of wheel
rings. | | | | | |
| 19. Bollers: | | | | | |
| (a) Number and
type. | 1 Mississippi River | 1, cylindrical, flue. | 2 horizontal cylindrical, re-
turn flue. | 3, Mississippi River type | 1 dry-back Scotch marine. |
| (b) Dimensions. | 42 inches diameter, 24 feet
long. | 44 inches diameter, 16 feet
long. | 22 feet long; diameter, 3 feet
2 inches. | 40 inches diameter, 24 feet
long. | 16 feet long, 8 feet diameter. |
| (c) Number and di-
ameter of flues
in one boiler. | Two 11-inch, two 9 1/2-inch. | Eighteen 4-inch. | 6 flues, 6-inch diameter. | Two 14-inch. | Seventy-two 4-inch. |
| (d) Total heating sur-
face. | 425 square feet. | 420 square feet. | 708 square feet. | 980 square feet. | 1,316 square feet. |
| (e) Total grate sur-
face. | 20 square feet. | 13 square feet. | 72 square feet. | 50 square feet. | 33 square feet. |
| (f) Steam pressure. | 175 pounds. | 175 pounds. | 177 pounds. | 200 pounds. | 200 pounds. |
| 20. Speed in miles per hour
(average of up and
down stream speed). | 6. | 8 1/2. | 11. | 8 to 9 up, 13 down. | 8 up, 10 down. |
| 21. Towing capacity. | 800 tons. | 1 barge. | 220 horsepower. | 9. | 400 tons. |
| 22. Number of men in crew | 6. | 7. | 7. | 9. | 11. |
| OPERATING COST. | | | | | |
| 23. Pay roll. | \$339.84 | \$2,880.01 | \$4,088.66 | \$6,367.29 | \$2,187.51 |
| 24. Subsistence. | 83.00 | 888.00 | | 1,273.54 | 890.21 |
| 25. Supplies: | | | | | |
| (a) Engine room. | 5.38 | 44.05 | 13.97 | 218.58 | 48.41 |
| (b) Boiler room. | 16.77 | 30. | 8.45 | 16.35 | 37.35 |
| (c) Miscellaneous. | 97.35 | 134.62 | 164.90 | 683.27 | 13.02 |
| 26. Coal. | | 325.43 | 796.14 | 2,161.54 | 1,137.95 |
| 27. Oil: | | | | | |
| (a) Kerosene. | 60. | 80. | | 12.12 | 2.86 |
| (b) Lubricating. | 3.15 | 4.85 | 16.60 | 44.66 | 31.00 |
| 28. Ordinary repairs: | | | | | |
| (a) Hull. | 973.41 | 419.70 | 114.09 | 244.50 | |
| (b) Machinery. | 681.56 | 806.53 | 6.90 | 10.00 | \$358.15 |
| 29. Extraordinary repairs: | | | | | |
| (a) Hull. | | | | 75.80 | |
| (b) Machinery addi-
tions. | | | | | |
| (a) Hull. | | | | 570.17 | |
| (b) Machinery. | | | | 5,428.60 | |
| 31. Laundry, ice, and mis-
cellaneous expenses. | 4.98 | | 106.22 | 179.77 | 26.91 |
| 32. Office expenses. | | 140.65 | | 68.31 | |
| 3. Total | \$2,206.99 | \$5,808.94 | \$6,312.83 | \$17,364.68 | \$5,233.38 |

TABLE XVI.—*Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—(continued).*

| 1. Name..... | Memac. | Mercury. | Merrill. | Miami. | Minneapolis. |
|--|----------------------|---|--------------------------------|--------------------------------------|---|
| 2. District..... | St. Louis, Mo. | St. Louis, Mo., Mississippi River Commission. | Second, Cincinnati. | First, Cincinnati, Ohio. | Rock Island, Ill. |
| 3. Where built..... | Jeffersonville, Ind. | Jeffersonville, Ind. | Jeffersonville, Ind. | Cincinnati, Ohio. | Grafton, Ill. |
| 4. When built..... | 1900. | 1899. | 1907-8. | 1912. | 1914-15. |
| 5. Builder..... | Ed. J. Howard | M. A. Sweeney Co. | Howard Ship Yard Co. | The Charles Barnes Co. | Ed. J. Howard and United States. |
| 6. Time to build..... | 16 months. | 13 months. | 6 months. | 10 months. | 10 months. |
| 7. Where purchased..... | | | | | |
| 8. When purchased..... | | | | | |
| 9. From whom purchased..... | | | | | |
| 10. Purchase price..... | | | | | |
| 11. Material of hull..... | Steel. | Steel. | Wood. | Steel and ingot iron. | Steel. |
| 12. Material of house..... | Wood. | Wood. | do. | Wood. | Wood, poplar. |
| 13. Contract price..... | \$18,361. | \$7,749. | \$14,400. | \$43,374. | \$44,686.30. |
| 14. Cost of outfit..... | \$1,126.30. | \$600. | \$1,479. | \$2,637.66. | \$36,475.74. |
| 15. Present value..... | \$8,150. | \$54,000. | \$7,140. | \$44,000. | |
| 16. Hull..... | | | | | |
| (a) Length over all..... | 118 feet. | 94 feet 6 inches. | 131 feet 6 inches. | 157 feet 11 inches. | 144 feet 10 inches. |
| (b) Length on water line..... | 100 feet. | 78 feet 3 inches. | 112 feet. | 133 feet. | 122 feet. |
| (c) Length of hull..... | 102 feet. | 80 feet. | 115 feet. | 137.5 feet. | 126 feet 4 inches. |
| (d) Beam over all..... | 25 feet. | 18 feet 4 inches. | 23 feet. | 31 feet 1 inch. | 34 feet 8 inches. |
| (e) Beam on water line..... | 23 feet 4 inches. | 17 feet. | 21 feet 10 inches. | 30 feet. | 31 feet. |
| (f) Molded depth amidship..... | 4 feet 3 inches. | 3 feet 9 inches. | 3 feet 6 inches. | 4 feet 3 inches. | 4 feet 1 inch. |
| (g) Draft forward..... | 4 feet 3 inches. | 3 feet 1 inch. | 2 feet 10 inches. | 2 feet 5 inches. | 3 feet. |
| (h) Draft aft..... | 4 feet. | 2 feet 8 inches. | 2 feet 7 inches. | 2 feet 5 inches. | 2 feet 10 inches. |
| (i) Displacement (long tons)..... | 160. | 83. | 163. | 229. | 254. |
| 17. Engines..... | | | | | |
| (a) Number and type of propelling engines..... | 2 Mississippi River. | 1 pair, horizontal high pressure. | 2 high-pressure, puppet-valve. | 2 noncondensing, California cut-off. | 2 tandem compound poppet valve, California cut-off. |
| (b) Diameter and stroke..... | 12 inches; 5 feet. | 8½ inches; 4 feet. | 11 inches; 5 feet. | 14 inches; 72 inches. | 9 and 18 inches; 6 feet. |
| (c) Revolutions per minute, light..... | 25. | 24. | 28. | 28. | 23. |
| (d) Revolutions per minute, towing..... | 20. | 20. | 24. | 22. | 14 to 21. |
| 18. Paddle wheel..... | | | | | |
| (a) Diameter..... | 11 feet 6 inches. | 12 feet. | 15 feet. | 16 feet. | 16 feet. |
| (b) Number of buckets..... | 11. | 12. | 14. | 14. | 16. |

FLOATING PLANT.

4481

[illegible]

TABLE XVI.—Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name..... | Memec. | Mercury. | Merril. | Miami. | Minneapolis. |
|--|--|--|---|---|--|
| OPERATING COST—CON. | | | | | |
| 34. Cost of coal per long ton..... | \$2.35..... | \$2.00, \$2.20, \$2.40, \$2.539..... | \$2.21..... | Average, \$2.06+..... | \$.277 |
| 35. Cost of oil per gallon..... | | Kerosene, 84 cents; lubricating, 33 to 60 cents. | Engine, \$0.24; cylinder, \$0.34. | | |
| 36. By whom and when repairs were made..... | U. S. Engineer depot..... | United States during year..... | Regular crew..... | United States; spring and fall, 1916. | United States, as needed. |
| 37. Days under steam..... | 34..... | 159..... | 227..... | 181..... | 122..... |
| 38. Remarks on work done by towboat during year. | Towing for construction works.

<i>Remarks.</i>
Mississippi River between mouths of Ohio and Missouri Rivers. | <i>Remarks.</i>
Used as survey boat in connection with dredging operations, Mississippi River below Cairo, and as revenue-tender, Trotters Point, Miss. | Served as dredge tender.

<i>Remarks.</i>
Muskingum River. | Served as tender to United States dredges engaged in dredging operations on Ohio River. During the season new boilers were installed on the boat. | Fleet tender, general towing.

<i>Remarks.</i>
Operated on Mississippi River division, Rock Island to Burlington; served as dredge tender, fleet tender, towing barges, transferring plant, and general towing.
1 Includes cost of outfit. |

TABLE XVI.—Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916.

| 1. Name..... | Minnesota. | Mississippi. | Muscatine. | Neosho. | Newton, General John. |
|---|--|---|--|--|--|
| 18. Paddle wheel:
(a) Diameter.....
(b) Number of buckets.....
(c) Length and width of buckets.....
(d) Diameter of shaft.....
(e) Number of wheel flanges.....
(f) Number and type.....
(g) Dimensions.....
(h) Number and diameter of flues in one boiler.....
(i) Total heating surface.....
(j) Total grate surface.....
(k) Steam pressure.....
(l) Speed in miles per hour (average of up and down stream speed).
(m) Towing capacity.....
(n) Number of men in crew..... | 21 feet 3 inches.....
16.....
21 feet long by 30 inches wide.....
Hexagonal, diameter of inscribing circle 12 inches.....
5.....
4 Mississippi River type, return flue.....
26 feet long by 44 inches diameter.....
3 flues 10 inches and 2 flues 11 inches diameter.....
2,221.44 square feet.....
126 square feet.....
176 pounds allowed.....
12.5.....
16 barges of 500 tons load each.....
17 single crew..... | 22 feet.....
20.....
20 feet 8 inches by 2 feet 3 inches.....
10½ inches.....
4.....
3, cylindrical, flue.....
44 inches by 28 feet 6 inches.....
2 of 11 inches, 3 of 9 inches diameter.....
1,716 square feet.....
60 square feet.....
155 pounds.....
12.....
3 barges.....
40..... | 14.10 feet.....
16.....
26 inches wide, 20 feet long.....
8½ inches.....
5.....
1 Scotch dry-back marine.....
8 by 16 feet.....
7½, 4 inches.....
1,302 square feet.....
33 square feet.....
200 pounds.....
8 up, 12 down.....
600 tons.....
11..... | 16 feet.....
16.....
20 feet by 26 inches.....
8 inches.....
5.....
1 internal furnace type.....
8 feet by 8½ inches by 16 feet.....
7½, 4-inch tubes.....
1,316 square feet.....
23 square feet.....
200 pounds.....
8-10 miles (light).....
400 tons.....
16 (double crew)..... | 22 feet.....
17.....
13 by 2 feet.....
6½ inches.....
3.....
1 Hopkins marine.....
6 feet diameter 12 feet long.....
128 of 3-inch diameter.....
1,365 square feet.....
28½ square feet.....
200 pounds.....
13.8.....
1,000 tons upstream.....
12..... |
| OPERATING COST. | | | | | |
| 23. Pay roll..... | \$6,724.56 | \$6,340.55 | \$1,987.06 | \$2,831.00 | \$7,320.00 |
| 24. Subsistence..... | 2,640.57 | 3,080.29 | 552.77 | 913.85 | 2,300.00 |
| 25. Supplies: | | | | | |
| (a) Engine room..... | 90.41 | | 20.66 | 182.07 | 34.00 |
| (b) Boiler room..... | 1.93 | | 4.50 | 24.29 | 7.00 |
| (c) Miscellaneous..... | 45.19 | | 242.72 | 34.50 | |
| 26. Coal..... | 8,918.60 | 2,640.16 | 951.28 | 1,609.86 | 2,126.40 |
| 27. Oil: | | | | | |
| (a) Kerosene..... | 5.80 | 32.59 | 2.70 | 6.20 | 30.00 |
| (b) Kerosene..... | 107.66 | 77.76 | 10.12 | 28.15 | 72.00 |
| 28. Ordnance..... | | | | | 978.00 |
| (a) Gun..... | | 3,024.15 | 220.87 | | 1,768.00 |
| (b) Machinery..... | 2,162.50 | 1,021.61 | 6.50 | 64.54 | |

[illegible]

TABLE XVI.—Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name. | Nokomis. | Noby, Augustus J. | Wagent. | Oceas. | Oceas. |
|--|---|---|------------------------|------------------------------------|--|
| 2. District. | St. Louis, Mo., Mississippi River Commission. | Mississippi River, first and second districts, Memphis, Tenn. | Mobile, Ala. | Chattanooga, Tenn. | Kansas City, Mo. |
| 3. Where built. | Dubuque, Iowa. | Dubuque, Iowa. | Jeffersonville, Ind. | Muscle Shoals Canal, Ala. | Great Falls, Mont.; rebuilt Omega River. |
| 4. When built. | 1899. | 1912. | 1904. | 1914. | Rebuilt 1911. |
| 5. Builder. | Louis Iron Works (Ltd.). | Dubuque Boat & Boiler Works. | Ed J. Howard. | U. S. Engineer Department. | United States. |
| 6. Time to build. | 15 months. | 1 year. | 6 months. | 276 days. | 5 months. |
| 7. Where purchased. | | | Louisville, Ky. | | |
| 8. When purchased. | | | 1906. | | |
| 9. From whom purchased. | | | W. F. Nugent & Bros. | | |
| 10. Purchase price. | | | \$19,000. | | |
| 11. Material of hull. | Steel. | Steel. | Wood. | Wood. | Wood. |
| 12. Material of house. | Wood. | Wood. | do. | do. | Do. |
| 13. Contract cost. | \$46,673. | \$34,726. | \$19,000. | \$14,675.33. | \$2,600. |
| 14. Cost of outfit. | | \$1,000. | \$2,000. | | \$1,000. |
| 15. Present value. | \$18,000. | \$31,404.36. | \$10,000. | \$12,651. | \$2,000. |
| 16. Hull: | | | | | |
| (a) Length over all. | 192 feet 4 inches. | 136 feet. | 141 feet 3 inches. | 115 feet. | 63 feet 3 inches. |
| (b) Length on water line. | 167 feet 4 inches. | 116 feet. | 118 feet 7 inches. | 94 feet 6 inches. | 66 feet 1 inch. |
| (c) Length of hull. | 171 feet 6 inches. | 116 feet. | 120 feet 4 inches. | 100 feet. | 63 feet 5 inches. |
| (d) Beam over all. | 37 feet 8 inches. | 25 feet 1 inch. | 24 feet 6 inches. | 22 feet 5 inches. | 15 feet 1 inch. |
| (e) Beam on water line. | 36 feet. | 24 feet. | 24 feet. | 21 feet 6 inches. | 14 feet 6 inches. |
| (f) Molded depth amidship. | 5 feet 6 inches. | 5 feet. | 4 feet 3 inches. | 3 feet. | 3 feet 2 inches. |
| (g) Draft forward. | 4 feet. | 2 feet 6 inches. | 3 feet 6 inches. | 2 feet 2 inches. | 1 foot 5 inches. |
| (h) Draft aft. | 4 feet 7 inches. | 2 feet 6 inches. | 3 feet 6 inches. | 2 feet 6 inches. | 3 feet 2 1/2 inches. |
| (i) Displacement (long tons). | 500. | 150. | 101 tons. | 120. | 30. |
| 17. Engines: | | | | | |
| (a) Number and type of propelling engines. | 1 pair, horizontal, high pressure. | 1 cross compound condensing. | 2 high pressure. | 2 slide-valve poppet out-off type. | 2 high pressure. |
| (b) Diameter and stroke. | 22 inches by 8 feet. | 13 by 26 inches diameter by 6-foot stroke. | 18 inches 5 feet. | 9 inches diameter, 36-inch stroke. | 7 inches by 2 feet 6 inches. |
| (c) Revolutions per minute, light. | 15. | 23. | 24. | 32. | 35. |
| (d) Revolutions per minute, towing. | 17. | 18 to 20. | 16 with 2,000-ton tow. | 26. | 29. |
| 18. Paddle wheel: | | | | | |
| (a) Diameter. | 24 feet. | 16 feet. | 16 feet. | 11 feet 6 inches. | 9 feet 4 inches. |
| (b) Number of buckets. | 16. | 12. | 14. | 10. | 10. |

7 feet 9 inches by 18 inches.

| | 24 feet by 34 inches..... | 15 feet 8 inches long by 24 inches wide. | 16 feet long by 28 inches wide. | 14 feet long by 18 inches wide. | 7 feet 9 inches by 18 inches. |
|--|------------------------------|--|--|-------------------------------------|-------------------------------|
| | | | | | |
| (c) Length and width of back-etc. | 12 inches..... | Hexagonal, 8 inches diameter of inscribing circle. | 7 inches in journals, 7 1/2 inches in body of shaft. | 5 1/2 inches hexagon shaft. | Three 1 1/2 inch. |
| (d) Diameter of shaft. | 5..... | 4..... | 4..... | 4..... | 3..... |
| (e) Number of wheel flanges. | 6, cylindrical, five..... | 2 Mississippi River type, return flue..... | 2 western river..... | 2 marine..... | 1 Scotch marine. |
| 19. Boilers: | 38 inches by 30 feet..... | 20 feet long by 42 inches diameter. | 42 inches by 24 feet..... | 38 inches diameter by 14 feet long. | 43 inches by 20 feet. |
| (a) Number and type. | 2 of 13 inches diameter..... | 10 flues, 6 inches diameter..... | Six, 3 of 10 inches and 3 of 7 inches. | Six 6-inch flues in each. | |
| (b) Dimensions..... | 2,472 square feet..... | 844.68 square feet..... | 940 square feet..... | 450 square feet..... | 12 1/2 square feet. |
| (c) Number and diameter of flues in one boiler. | 99 square feet..... | 40.50 square feet..... | 34 square feet for both boilers. | 36 square feet..... | 11.87 square feet. |
| (d) Total heating surface. | 165 pounds..... | 180 pounds allowed..... | 173 pounds..... | 214 pounds..... | 200 pounds. |
| (e) Total grate surface. | 14..... | 7..... | 11 miles..... | 8..... | 9..... |
| (f) Steam pressure. | 6 barges..... | 4 barges of 500 tons load each. | 2,000 tons..... | 8..... | 1 barge; 150 tons cargo. |
| 20. Speed in miles per hour (average of up and down stream speed). | 13..... | 13 single crew..... | 13..... | | |
| 21. Towing capacity..... | | | | | |
| 22. Number of men in crew..... | | | | | |
| OPERATING COST. | | | | | |
| 23. Pay roll..... | \$8,787.15 | \$9,637.28 | \$3,924.65 | \$3,237.06 | \$305.38 |
| 24. Subsistence..... | 2,295.45 | 2,532.53 | 687.45 | 1,027.82 | 87.86 |
| 25. Supplies: | | | | | |
| (a) Engine room..... | 200.22 | 151.52 | 94.97 | 36.60 | |
| (b) Boiler room..... | 1,112.31 | 27.78 | 32.48 | | |
| (c) Miscellaneous..... | | 2.70 | 105.35 | 64.52 | |
| 26. Coal..... | 4,265.52 | 4,435.22 | 737.05 | 1,275.26 | 184.71 |
| 27. Oil: | | | | | |
| (a) Kerosene..... | 8.14 | 24.15 | 6.30 | 23.92 | |
| (b) Lubricating..... | 104.12 | 84.86 | 3.80 | 66.38 | 5.01 |
| 28. Ordinary repairs: | | | | | |
| (a) Hull..... | 1,118.98 | 225.00 | 129.05 | 1,601.82 | 8.26 |
| (b) Machinery..... | 1,268.22 | 460.35 | 110.30 | 114.87 | 36.63 |
| 29. Extraordinary repairs: | | | | | |
| (a) Hull..... | | | 1,685.74 | | |
| (b) Machinery..... | | | 326.25 | | |
| 30. Alterations and additions: | | | | | |
| (a) Hull..... | 374.80 | | 126.09 | | |
| (b) Machinery..... | 6,375.49 | | | | |
| 31. Laundry, ice, and miscellaneous expenses. | 258.59 | 765.65 | 40.79 | 76.14 | |
| 32. Office expenses..... | | (1) | | | 24.84 |
| 33. Total..... | \$26,115.14 | \$18,430.40 | \$8,078.53 | \$7,525.41 | \$362.70 |

TABLE XVI.—Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name | Nokomis. | Noddy, Augustus J. | Nugent. | Oceez. | Osege. |
|--|--|---|---|--|--|
| OPERATING COST—Contd. | | | | | |
| 34. Cost of coal per long ton..... | \$2.75..... | \$2.80..... | 480.84 long tons, at \$1.53..... | \$2.12..... | Coal, \$4.23; wood, \$2.26 (cord) |
| 35. Cost of oil per gallon..... | ..... | Kerosene, 8 to 10 cents; lubricating, 33 to 60 cents. | Kerosene, 10 cents; lubricating, 50 cents. | 48½ cents..... | 34 cents..... |
| 36. By whom and when repairs were made. | United States, from time to time. | (*)..... | United States, during months of September, October, and November. | U. S. Engineer Department. | United States, during season. |
| 37. Days under steam..... | ..... | 366..... | 117..... | 340..... | 95..... |
| 38. Remarks on work done by towboat during year. | <p>See Remarks.....</p> <p>Remarks.</p> <p>Used by Board of Engineers on experimental towboats for Mississippi River and tributaries in making experimental tows between St. Louis and Cairo, Ill., and at Keokuk, Iowa.</p> <p>Operating costs include experimental tools, instruments, etc., and alterations and additions to machinery, etc.</p> | <p>See Remarks.....</p> <p>Remarks.</p> <p>1 Not kept separately.
2 By United States at Government fleet from time to time as required.
3 Tender to revetment party at Delta, Miss. Part of time with double crew.</p> | <p>See Remarks.....</p> <p>Remarks.</p> <p>This boat was operated on Black Warrior and Tombigbee Rivers, Ala., towing coal and other supplies; 2,245 miles run, at \$3.62 per mile; 603,951 mile-tons of freight towed, at \$0.0134 per mile-
ton.</p> | <p>See Remarks.....</p> <p>Remarks.</p> <p>Conveying supplies to fleets on upper Tennessee River and to Hales Bar lock and dam from boat yard at Chattanooga, Tenn., and re-
moving steamers in fleets while they are being repaired.</p> | <p>See Remarks.....</p> <p>Remarks.</p> <p>Operated on the Osage River, Mo., in connection with lock and dam and attendant to dredge.</p> |

| 1. Name..... | Ottawa. | Pearl. | Flaquemine. | Egan, W. M. | Roberts, T. P. |
|--|--|---------------------------|---|---|--|
| 2. District..... | First, Cincinnati, Ohio..... | Chicago, Ill..... | New Orleans (fourth Mississippi River). | Mississippi River, first and second districts, Memphis, Tenn. | Pittsburgh, Pa. |
| 3. Where built..... | Cincinnati, Ohio..... | Beardstown, Ill..... | Jeffersonville, Ind..... | Dubuque, Iowa..... | Marietta, Ohio. |
| 4. When built..... | 1915-16..... | 1909..... | 1910..... | 1912..... | 1906..... |
| 5. Builder..... | The Charles Barnes Co..... | United States..... | Ed. J. Howard..... | Dubuque Boat & Boiler Works..... | J. M. Hammitt. |
| 6. Time to build..... | 12 months..... | 9 months..... | 13 months..... | 1 year..... | |
| 7. Where purchased..... | | | | | |
| 8. When purchased..... | | | | | |
| 9. From whom purchased..... | | | | | |
| 10. Purchase price..... | Steel..... | Wood..... | Steel..... | Steel..... | Wood..... |
| 11. Material of hull..... | Wood..... | do..... | Wood..... | Wood..... | do..... |
| 12. Material of house..... | \$47,789.50..... | \$7,000..... | \$85,700..... | \$34,735..... | \$17,870..... |
| 13. Contract cost..... | \$3,568.13..... | | \$1,258.37..... | \$1,000..... | |
| 14. Cost of outfit..... | \$49,706.89..... | \$6,318..... | \$2,500..... | \$2,506.99..... | \$10,000..... |
| 15. Present value..... | | | | | |
| 16. Hull:..... | | | | | |
| (a) Length over all..... | 133 feet 10 inches..... | 100 feet 1 inch..... | 136 feet..... | 136 feet..... | 133 feet 2 inches..... |
| (b) Length on water line..... | 128 feet 7 inches..... | 82 feet 8 inches..... | 135 feet..... | 116 feet..... | 112 feet 2 inches..... |
| (c) Length of hull..... | 142 feet..... | 85 feet 1 inch..... | 116 feet..... | 116 feet..... | 115 feet..... |
| (d) Beam over all..... | 31 feet 1 inch..... | 19 feet 2 inches..... | 29 feet 6 inches..... | 23 feet 1 inch..... | 22 feet 10 inches..... |
| (e) Beam on water line..... | 30 feet..... | 16 feet 4 inches..... | 27 feet 10 inches..... | 24 feet..... | 22 feet 4 inches..... |
| (f) Molded depth amidship..... | 4 feet 3 inches..... | 4 feet 2 inches..... | 5 feet 6 inches..... | 5 feet..... | 5 feet..... |
| (g) Draft forward..... | 2 feet 6 inches..... | 2 feet 8 inches..... | 4 feet 2 inches..... | 2 feet 6 inches..... | 4 feet 4 inches..... |
| (h) Draft aft..... | 2 feet 6 inches..... | 2 feet 10 inches..... | 4 feet..... | 2 feet 6 inches..... | 4 feet 10 inches..... |
| (i) Displacement (long tons)..... | 254.3..... | 45..... | 300..... | 150..... | 206..... |
| 17. Engines:..... | | | | | |
| (a) Number and type of propelling engines..... | 2 noncondensing; California cut-off..... | 2 poppet valve..... | 2 tandem compound..... | 1 cross-compound condensing..... | 2 high-pressure lever engines, Marietta Manufacturing Co. (noncondensing). |
| (b) Diameter and stroke..... | 15 inches by 72 inches..... | 10 feet by 48 inches..... | 12 and 26 by 27 inches..... | 13 and 26 inches diameter, 5-foot stroke..... | 12 inches diameter by 5-foot stroke..... |
| (c) Revolutions per minute, light..... | 28..... | 27..... | 19..... | 22..... | 22..... |
| (d) Revolutions per minute, towing..... | 23..... | 20..... | 17..... | 18 to 30..... | 18..... |

TABLE XVI.—Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name..... | Obuse. | Peel. | Plaquemine. | Rees, W. M. | Roberts, T. P. |
|---|---|--|--|---|--|
| 18. Paddle wheel:
(a) Diameter.....
(b) Number of buckets.....
(c) Length and width of buckets.....
(d) Diameter of shaft.....
(e) Number of wheel flanges..... | 16.5 feet.....
14.....
19.5 feet by 2.5 feet.....
Hexagon, 8.5 inches least diameter.....
6..... | 13 feet 4 inches.....
13.....
10 feet by 24 inches.....
6 inches.....
3..... | 13 feet.....
14.....
17 feet 4 inches by 24 inches.....
9½ inches.....
5..... | 16 feet.....
12.....
15 feet 8 inches long.....
8 inches diameter of inscribing circle.....
4..... | 16 feet.....
13.....
16 feet by 24 inches.....
6½ inches.....
4..... |
| 19. Boilers:
(a) Number and type.....
(b) Dimensions.....
(c) Number and diameter of flues in 1 boiler.....
(d) Total heating surface.....
(e) Total grate surface.....
(f) Steam pressure.....
(g) Speed in miles per hour (average of up and down stream speed).....
(h) Towing capacity..... | 3 Mississippi River.....
40 inches diameter, 24 feet long.....
Four 6-inch and two 10-inch.....
1,237 square feet.....
80 square feet.....
200 pounds.....
14 miles, running light..... | 2 horizontal.....
38 inches by 14 feet.....
Twenty-four 3-inch and two 2½-inch.....
760 square feet.....
21 square feet.....
10.....
400 tons 2 miles per hour upstream.....
5..... | 3 Mississippi River type.....
18 feet long, 44 inches diameter.....
Two 12-inch and four 7-inch.....
1,140.80 square feet.....
49 square feet.....
171 pounds.....
10 miles..... | 2 Mississippi River type, return flue.....
20 feet long by 42 inches diameter.....
10 flues, 6 inches diameter.....
846.68 square feet.....
40.80 square feet.....
180 pounds allowed.....
7..... | 2 cylinder flue boilers, 2 flues in each.....
22 feet long by 40 inches diameter.....
2 of 14 inches.....
688 square feet.....
88 square feet.....
185 pounds.....
89..... |
| 21. Towing capacity..... | 9..... | 400 tons 2 miles per hour upstream..... | 2,000 tons upstream..... | 4 barges loaded with 500 tons each.....
13 single crew..... | Two 100-horsepower engines.....
10..... |
| 22. Number of men in crew..... | 9..... | 5..... | 12 single, 20 double..... | | |
| OPERATING COST. | | | | | |
| 23. Pay roll..... | \$4,200.17 | \$1,305.06 | \$4,404.04 | \$6,608.20 | \$6,608.20 |
| 24. Subsistence..... | 1,151.58 | 408.89 | 1,314.00 | 1,482.16 | 1,768.33 |
| 25. Supplies:
(a) Engine room.....
(b) Boiler room.....
(c) Miscellaneous..... | 424.10
23.16
616.71 | 24.80
7.42
17.08 | 31.00
2.68 | 138.88
18.09
37.20 | 61.41
67.47
1,780.13 |
| 26. Coal..... | 1,708.56 | 686.23 | 4,964.00 | 3,045.86 | |
| 27. Oil:
(a) Kerosene.....
(b) Lubricating..... | 88.06 | 3.00
20.81 | 6.00
64.00 | 4.00
87.81 | 15.30
48.80 |

| | | | | | |
|---|-----------------------------|---|----------------------|---|--|
| 28. Ordinary repairs: | 65.42 | 210.80 | 122.00 | 375.20 | 221.88 |
| (8) Hull..... | 8.35 | 150.91 | 1,850.00 | 1,280.80 | 98.57 |
| 29. Extraordinary repairs: | | | | | |
| (8) Hull..... | | 945.13 | | | 563.30 |
| (8) Machinery..... | | | | | |
| 30. Alterations and additions: | | | | | |
| (4) Hull..... | 53.19 | | | | |
| (8) Machinery..... | 163.64 | 13.00 | | | 755.46 |
| 31. Laundry, ice and miscellaneous expenses..... | | | 97.50 | | |
| 32. Office expenses..... | 97.28 | 215.50 | | (1) | |
| 33. Total..... | | 28,576.30 | \$12,371.19 | \$12,024.45 | \$14,740.98 |
| 34. Cost of coal per long ton..... | \$2,194.41 | \$1.68 and \$1.92..... | \$4.25..... | \$2.80..... | \$1.60 to \$2.50. |
| 35. Cost of oil per gallon..... | | Kerosene 8 cents; lubricating, \$1.4 cents. | 50 cents. | Kerosene, 8 to 10 cents; lubricating, 53 to 60 cents. | 20 to 32 cents. |
| 36. By whom and when repairs were made..... | United States, season 1916. | United States during year..... | United States depot. | United States Engineer. | James Reas & Sons Co, Pittsburgh, September, 1916. |
| 37. Days under steam..... | 224 | 179 | 146..... | 258..... | Year. |
| 38. Repairs on work done by towboat during year..... | | | Excellent. | (2) | (1). |
| Remarks. | | | | | |
| The Ottawa was put in commission in May, 1916, and during the balance of the year was engaged in tending and barge work in connection with dredging operations on the Ohio River. | | On Illinois River, tending dredges. | | Towing willow mats from willow bar to Passes and to Grand Bay Toward Passes from New Orleans to Passes and to Grand Bay. Towing rock from Vidalia to Grand Bay. | |
| Includes contract cost, equipment, office expenses, inspection, etc., complete. | | Includes cost of outfit. | | 1 Not kept separately. United States labor at Government fleet from time laid up 2 months; 10 months tender to retirement party at Slough Landing West, Ky., part of time with double crew. | |
| | | | | 1 Tending and assisting dredge No. 2; gathering up unserviceable property; inspection trip; towing 1,078 pieces and 1,328 miles run on Manassas, Ohio, and Allegheny Rivers. | |

TABLE XVI.—*Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.*

| 1. Name..... | Boat. | Seachm. | Seated. | Saturn. | Sailed. |
|--|--|---|---|---|-------------------------------------|
| 2. District..... | Rock Island, Ill..... | St. Louis, Mo., Mississippi River Commission. | St. Louis, Mo., Mississippi River Commission. | St. Louis, Mo., Mississippi River Commission. | First, Cincinnati, Ohio. |
| 3. Where built..... | Keokuk, Iowa..... | Dubuque, Iowa..... | Jeffersonville, Ind..... | Jeffersonville, Ind..... | Cincinnati, Ohio. |
| 4. When built..... | 1886..... | 1889..... | 1900..... | 1912..... | 1912..... |
| 5. Builder..... | United States, Des Moines Rapids Canal shop. | Iowa Iron Works (Ltd.)..... | Ed. J. Howard..... | Ed. J. Howard..... | The Chas. Barnes Co. |
| 6. Time to build..... | 8 months..... | 15 months..... | 14 months..... | 9 months..... | 10 months..... |
| 7. Where purchased..... | | | | | |
| 8. When purchased..... | | | | | |
| 9. From whom purchased..... | | | | | |
| 10. Purchase price..... | | | | | |
| 11. Material of hull..... | Oak..... | Steel..... | Steel..... | Steel..... | Steel and ingot iron. |
| 12. Material of house..... | Pine..... | Wood..... | Wood..... | Wood..... | Wood. |
| 13. Contract cost..... | \$5,946..... | \$45,672..... | \$15,150..... | \$17,175..... | \$45,374..... |
| 14. Cost of outfit..... | \$479.76..... | \$1,120.50..... | \$1,120.50..... | \$300..... | \$2,746.91..... |
| 15. Present value..... | \$3,426.47..... | \$17,900..... | \$7,250..... | \$14,200..... | \$40,000..... |
| 16. Hull..... | | | | | |
| (a) Length over all..... | 88 feet..... | 120 feet 4 inches..... | 118 feet 3 inches..... | 118 feet..... | 157 feet 11 inches. |
| (b) Length on water line..... | 74 feet..... | 157 feet 4 inches..... | 100 feet..... | 96 feet..... | 132 feet..... |
| (c) Length of hull..... | 76 feet..... | 171 feet 6 inches..... | 102 feet..... | 99 feet..... | 137 feet 5 inches. |
| (d) Beam over all..... | 17 feet..... | 27 feet 8 inches..... | 26 feet..... | 23 feet..... | 31 feet 8 inch. |
| (e) Beam on water line..... | 16 feet 7 inches..... | 36 feet..... | 23 feet 4 inches..... | 20 feet..... | 30 feet..... |
| (f) Molded depth amidship..... | 3 feet..... | 5 feet 6 inches..... | 4 feet 3 inches..... | 4 feet 6 inches..... | 4 feet 3 inches. |
| (g) Draught forward..... | 2 feet 8 inches..... | 4 feet..... | 3 feet 9 inches..... | 3 feet 3 inches..... | 2 feet 5 inches. |
| (h) Draught aft..... | 3 feet..... | 4 feet 7 inches..... | 3 feet 9 inches..... | 3 feet 9 inches..... | 2 feet 5 inches. |
| (i) Displacement (long tons)..... | 40..... | 560..... | 150..... | 120..... | 229..... |
| 17. Engines..... | | | | | |
| (a) Number and type of propelling engines..... | 2 lever with poppet valve..... | 1 pair, horizontal high pressure..... | 2 Mississippi River..... | 1 pair, horizontal high pressure..... | 2 noncondensing California out-let. |
| (b) Diameter and stroke..... | 7 inches by 4 feet..... | 24 inches by 8 feet..... | 12 inches by 5-foot stroke..... | 9½ inches by 5 feet..... | 14 by 72 inches. |
| (c) Revolutions per minute, light..... | 36..... | 16..... | 36..... | 26..... | 28..... |
| (d) Revolutions per minute, towing..... | 20..... | 13..... | 20..... | 22..... | 22..... |
| 18. Paddle wheels..... | | | | | |
| (a) Diameter..... | 11 feet 9 inches..... | 24 feet..... | 13 feet..... | 15 feet..... | 16 feet. |
| (b) Number of buckets..... | 13..... | 14..... | 11..... | 13..... | 14..... |

| | | | | | |
|--|--|------------------------------|---------------------------------------|--|---|
| 19. Boilers: | 4½ inches..... | 13 inches..... | 7 inches..... | 5½ inches..... | 8 inches..... |
| (d) Diameter of shaft..... | 5..... | 5..... | 4..... | 4..... | 5..... |
| (e) Number of wheel flanges..... | 2 horizontal flue, Mississippi River type..... | 6, cylindrical, flue..... | 1 Mississippi River..... | 2, cylindrical, flue..... | 1 Lyons combined fire and water tube..... |
| (e) Number and diameter of flues in one boiler..... | 10 feet by 30 inches..... | 38 inches by 30 feet..... | 42 inches diameter, 24 feet long..... | 42 inches by 9 feet 6 inches..... | 66 inches by 18 feet..... |
| (c) Dimensions..... | 22 of 2½ inches..... | 2 of 13 inches diameter..... | Two 1½-inch; two 9½-inch..... | 36 of 2½ inches and 2 of 4½ inches diameter..... | 15 water and 66 fire tubes 4 inches by 18 feet..... |
| (d) Total heating surface..... | 430 square feet..... | 2,472 square feet..... | 426 square feet..... | 660 square feet..... | 1,549 square feet..... |
| (c) Total grate surface..... | 24 square feet..... | 90 square feet..... | 20 square feet..... | 28 square feet..... | 3,376 square feet..... |
| (f) Steam pressure..... | 180 pounds..... | 160 pounds..... | 175 pounds..... | 185 pounds..... | 200 pounds..... |
| 20. Speed in miles per hour (average of up and down stream speed)..... | 10..... | 12..... | 6..... | 8.6..... | 10.5..... |
| 21. Towing capacity..... | 300 tons, 4 miles per hour..... | 6 barges..... | 800 tons..... | 1 barge..... | 11..... |
| 22. Number of men in crew..... | 7..... | 14..... | 5..... | 7..... | 11..... |
| OPERATING COST. | | | | | |
| 23. Pay roll..... | \$3,021.48..... | ..... | \$1,354.50..... | 84,670.60..... | \$6,490.05..... |
| 24. Substances..... | 644.18..... | ..... | 362.50..... | 1,288.32..... | 1,411.83..... |
| 25. Supplies: | ..... | ..... | ..... | ..... | ..... |
| (a) Engine room..... | 2.05..... | ..... | 20.50..... | 33.57..... | 54.63..... |
| (b) Boiler room..... | 1.52..... | ..... | 1.40..... | ..... | 46.65..... |
| (c) Miscellaneous..... | 140.98..... | ..... | 53.00..... | 144.05..... | 540.03..... |
| 26. Coal..... | 770.00..... | ..... | 470.00..... | 1,188.90..... | 3,126.22..... |
| 27. Oil: | ..... | ..... | ..... | ..... | ..... |
| (a) Kerosene..... | 7.54..... | ..... | 2.40..... | 13.83..... | 84.83..... |
| (b) Lubricating..... | 16.66..... | ..... | 28.90..... | 7.30..... | ..... |
| 28. Ordinary repairs: | ..... | ..... | ..... | ..... | ..... |
| (a) Hull..... | 175.19..... | ..... | 238.19..... | 281.62..... | 2,397.40..... |
| (b) Machinery..... | ..... | ..... | 1,186.56..... | 842.89..... | ..... |
| 29. Extraordinary repairs: | ..... | ..... | ..... | ..... | ..... |
| (a) Hull..... | ..... | ..... | ..... | ..... | ..... |
| (b) Machinery..... | ..... | ..... | ..... | ..... | ..... |
| 30. Alterations and additions: | ..... | ..... | ..... | ..... | ..... |
| (a) Hull..... | ..... | ..... | ..... | ..... | ..... |
| (b) Machinery..... | ..... | ..... | ..... | ..... | ..... |
| 31. Laundry, ice and miscellaneous expenses..... | ..... | ..... | 17.68..... | 43.71..... | 67.90..... |
| 32. Office expenses..... | ..... | ..... | ..... | 79.72..... | ..... |
| 33. Total..... | \$4,770.00..... | \$1,262.06..... | \$3,709.63..... | 88,041.50..... | ..... |

TABLE XVI.—Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name..... | Fwd. | Sacks. | Sails. | Schwn. | Scldo. |
|--|--|-----------------------------------|--|--|--|
| OPERATING COST—CON. | | | | | |
| 24. Cost of coal per long ton..... | \$3.08..... | | \$2.35..... | \$2,539; \$2.20; \$2.001..... | \$2.80..... |
| 25. Cost of oil per gallon..... | Average, \$0.20..... | | | Signal at 40 cents; headlight, 24 cents; cylinder, 24 cents; engine, 12 cents..... | 22 cents; red engine, 14 cents..... |
| 26. By whom and when repairs were made..... | United States..... | United States, during year..... | U. S. Engineer depot..... | United States during year..... | U. S. Engineers during the working season..... |
| 27. Days under steam..... | 241, including Sundays..... | | 177..... | 221..... | 383..... |
| 28. Remarks on work done by towboat during year..... | See Remarks.

Remarks.
Operated on Mississippi River, Rock Island division, La Coudre Canal, Rock Island Rapids. Used as dredge tender, towing sand and rock, and general towing. | Remarks.
Not used during year. | Remarks.
Mississippi River between mouths of Ohio and Missouri Rivers.
Towing for construction work. | Remarks.
Used as survey boat in connection with dredging operations and on discharge of munitions and general inspection, Mississippi River below Cairo, Ill. | Remarks.
Operated on Dam No. 29, Ohio River, and vicinity, in general towing and harbor work. |

| 1. Name. | Search. | Shaves. | Simpson, Gen. J. H. | Stackwater. | Tide. |
|--|---|--|-----------------------------|---------------------------------------|--|
| 2. District. | Mississippi River, first and second districts, Memphis, Tenn. | Louisville, Ky. | St. Louis, Mo. | Pittsburgh, Pa. | New Orleans (fourth, Mississippi River). |
| 3. Where built. | Marquette, Ohio. | Jeffersonville, Ind.; rebuilt Louisville, Ky. | Jeffersonville, Ind. | Marquette, Ohio. | Jeffersonville, Ind. |
| 4. When built. | 1883. | 1887; rebuilt 1909. | 1886. | 1902. | 1911. |
| 5. Builder. | | Ed. J. Howard; rebuilt by United States. | Ed. J. Howard. | Inland Marine Construction Co. | Ed. J. Howard. |
| 6. Time to build. | | 6 months (about). | 7 months. | | 9 months. |
| 7. Where purchased. | St. Louis, Mo. | Jeffersonville, Ind. | | | |
| 8. When purchased. | 1885. | 1887. | | | |
| 9. From whom purchased. | Scott, Blake & Bell. | Ed. J. Howard. | | | |
| 10. Purchase price. | \$9,000. | \$9,750; rebuilding, \$8,461.21. | | | |
| 11. Material of hull. | Wood. | Wood. | Wood. | Wood. | Steel. |
| 12. Material of house. | do. | do. | do. | do. | Wood. |
| 13. Contract cost. | \$1,900. | \$5,750. | \$27,375. | \$13,500. | \$16,850. |
| 14. Cost of outfit. | | No record. | \$12,025. | | \$483.88. |
| 15. Present value. | \$8,869.26. | \$12,000. | \$6,500. | \$12,150. | \$14,400. |
| 16. Hull: | | | | | |
| (a) Length over all. | 138 feet 10 inches. | 117 feet. | 196 feet. | 137 feet 8 inches. | 100 feet. |
| (b) Length on water line. | 118 feet. | 96 feet. | 167 feet. | 116 feet 6 inches. | 98 feet. |
| (c) Length of hull. | 120 feet 6 inches. | 100 feet. | 170 feet. | 120 feet. | 86 feet. |
| (d) Beam over all. | 28 feet 9 inches. | 25 feet 4 inches. | 32 feet. | 26 feet 10 inches. | 20 feet 4 inches. |
| (e) Beam on water line. | 23 feet 9 inches. | 23 feet. | 32 feet. | 26 feet 4 inches. | 19 feet. |
| (f) Molded depth amidship. | 4 feet 10 inches. | 3 feet 6 inches. | 5 feet. | 4 feet 4 inches. | 5 feet. |
| (g) Draft forward. | 2 feet 6 inches. | 2 feet 10 inches. | 4 feet 3 inches. | 3 feet. | 3 feet 6 inches. |
| (h) Draft aft. | 2 feet 6 inches. | 2 feet 2 inches. | 4 feet 8 inches. | 4 feet 3 inches. | 3 feet. |
| (i) Displacement (long tons). | 200. | 83. | 235. | 242. | 90. |
| 17. Engines: | | | | | |
| (a) Number and type of propelling engines. | 2 tandem compound, non-condensing. | 2 Gillet & Eaton's high-pressure piston balance; valve variable cut-off. | 2 Mississippi River. | 2 noncondensing. | 2 high-pressure. |
| (b) Diameter and stroke. | 81 and 144 inches diameter by 4-foot stroke. | 10 inches by 5 feet. | 20 inches by 8-foot stroke. | 12 inches diameter by 41-foot stroke. | 10 by 80 inches. |
| (c) Revolutions per minute, light. | 24. | 21. | 18. | 24. | 26. |
| (d) Revolutions per minute, towing. | 20 to 22. | 18. | 15. | 16. | 24. |

TABLE XVI.—*Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.*

| 1. Name..... | Search. ¹ | Shafting. | Simpson, Gen. J. H. | Slackwater. | Techn. |
|--|---|--|---|---|---|
| 18. Paddle wheel:
(a) Diameter.....
(b) Number of buckets.....
(c) Length and width of buckets.....
(d) Diameter of shaft.....
(e) Number of wheel flanges..... | 13 feet 4 inches.
13
16 feet long by 17 inches wide.
6 inches, diameter of inscribed circle.
4 | 15 feet.
16
20 inches by 15 feet.
6 inches
5 | 21 feet 6 inches.
16
22 feet 8 inches long, 30 inches wide.
11½ inches
5 | 15 feet.
12
17 feet by 24 inches.
6½ inches
4 | 13 feet 6 inches.
13
12 feet 7 inches by 20 inches.
5½ inches
4 |
| 19. Rollers:
(a) Number of type.....
(b) Dimensions.....
(c) Number and diameter of flues in one boiler, heating surface.....
(d) Total grate surface.....
(e) Total grate area.....
(f) Steam pressure.....
(g) Speed in miles per hour (average of up and down stream speed).
(h) Towing capacity..... | 2 Mississippi River type, return flue.
16 feet long by 38 inches diameter.
6 flues, 6 inches diameter.
400 square feet.
30 square feet.
177 pounds allowed.
8½
2 barges loaded with 500 tons each.
14 | Bronson combination fire and water tube.
4 by 16 feet.
11 water, 4 inches; 40 fire, 3½ inches.
875.9 square feet.
20 square feet.
200 pounds.
10
1,400 tons.
7 | 4 Mississippi River.
42 inches diameter, 28 feet long.
4: two 11-inch, two 9½-inch.
2,000 square feet.
67.3 square feet.
160 pounds.
7
1,600 tons.
24 | 2 cylindrical flue.
20 feet long by 40 inches diameter.
4: two 9-inch, two 10-inch.
676 square feet.
32 square feet.
160 pounds.
9
Two 110-horsepower engines.
22 | 1 Scotch marine.
10 feet long, 9 feet diameter.
124 of 3-inch diameter.
966 square feet.
33 square feet.
180 pounds.
7½
600 tons upstream
7 |
| 20. Pay roll.....
21. Subsistence.....
22. Supplies.....
23. Engine room.....
24. Boiler room.....
25. Miscellaneous.....
26. Coal.....
27. Oil.....
(a) Kerosene.....
(b) Lubricating..... | \$2,429.90
664.09
9.50
21.94
611.36
5.50
14.55 | \$8,550.55
87.80
24.21
21.94
1,907.15
12.12
44.05 | \$1,592.67
360.02
19.04
96.45
644.10
4.07
45.45 | \$15,453.95
3,973.73
88.46
53.55
1,716.35
26.95
24.10 | \$2,887.47
861.85
28.32
7.80
1,823.66
8.40
69.64 |

| 28. Ordinary repairs: | (a) Hull..... | 273.50 | 708.13 | 865.04 | 115.00 | 955.00 |
|--|--|--|---|---|---|---|
| | | | | | | |
| 29. Extraordinary repairs: | (b) Machinery..... | | 1,414.31 | 350.16 | 146.01 | 1,224.00 |
| | (c) Hull..... | 3,542.06 | | | | |
| 30. Alterations and additions: | (b) Machinery..... | | | | | |
| | (c) Hull..... | 4.76 | 73.64 | | | 25.94 |
| 31. Laundry, ice, and miscellaneous expenses. | (c) Office expenses..... | (1) | | | 1,320.00 | |
| 32. Office expenses..... | | | | | | |
| 33. Total..... | | \$7,850.79 | \$12,854.70 | \$5,712.00 | \$22,970.17 | \$7,854.09 |
| 34. Cost of coal per long ton. | | \$2.80 | \$2.90 | \$1.848 | \$1.60 to \$2.60 | \$4.50 per ton. |
| 35. Cost of oil per gallon. | | Kerosene, \$0.06 to \$0.10; lubricating, \$0.33 to \$0.60. | 8 to 18 cents | U. S. Engineer depot. | 9 to 19 cents. | 12½ cents for kerosene; 43 cents for lubricating. |
| 36. By whom and when repairs were made. | | | United States, 1916. | | United States. | Engineer depot. |
| 37. Days under steam. | | 90 | 350 | 28 | 302 | 303. |
| 38. Remarks on work done by towboat during year. | | (1) | | | (1) | Towing plant and mattress construction. |
| | Remarks. | | | Remarks. | | Remarks. |
| | 1 Formerly No. 90235, H. D. Munson. Transferred from St. Louis, Mo., Mississippi River Commission, Dec. 1, 1915. | | Employed in miscellaneous towing in connection with the construction of dam No. 43, Ohio River. | Mississippi River between mouths of Ohio and Missouri Rivers. | 1 Assisted dredge No. 2; towed 696 pieces; run 1,159 miles; making general repairs to locks and dams Nos. 1 to 16 and assisted in the rebuilding of locks and dams Nos. 4 and 6, Monongahela River. | Towing lumber from Natches to Lake Palmyra for mattress construction; tender at mattress-construction plant, towing mats. |
| | 2 Not kept separately. | | 1 Not including cost of machinery transferred from old boat. | | | |
| | 3 United States Government fleet labor from time to time as required. Boat was docked and sides and head rebuilt. | | | | | |
| | 4 One month at Helena, Ark., tender to test boring outfit; 2 months on survey work; 3 months on dock being repaired; 6 months laid up. | | | | | |

TABLE XVI.—Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued

| 1. Name..... | Tenness. | Vega. | Venus. | Vulcan. | Warlike. |
|--|--|-----------------------------------|---|---|------------------------------|
| 2. District..... | New Orleans (fourth, Mississippi River). | Second, Cincinnati, Ohio..... | St. Louis, Mo., Mississippi River Commission. | St. Louis, Mo., Mississippi River Commission. | Nashville, Tenn. |
| 3. Where built..... | Chicago, Ill. | Jeffersonville, Ind. | Jeffersonville, Ind. | Dubuque, Iowa. | Dubuque, Iowa. |
| 4. When built..... | 1905. | Ed. J. Howard. | M. A. Sweeney Co. | 1897. | 1914-15. |
| 5. Builder..... | Chas. P. Willard & Co. | Ed. J. Howard. | M. A. Sweeney Co. | Iowa Iron Works (Ltd.)..... | Dubuque Boat & Boiler Works. |
| 6. Time to build..... | 5 months. | 6 months. | 13 months. | 4 months. | 300 days. |
| 7. Where purchased..... | | | | | |
| 8. When purchased..... | | | | | |
| 9. From whom purchased..... | | | | | |
| 10. Purchase price..... | | Wood. | Steel. | Steel. | Steel. |
| 11. Material of hull..... | Wood. | do. | Wood. | Wood. | Wood. |
| 12. Material of house..... | \$11,120. | \$9,806. | \$7,749. | \$7,080. | \$36,526. |
| 13. Contract cost..... | \$527.32. | \$700. | \$800. | \$400. | \$1,708.56. |
| 14. Cost of outfit..... | \$7,400. | \$2,000. | \$4,100. | \$4,000. | \$32,873. |
| 15. Present value..... | | | | | |
| 16. Hull: | | | | | |
| (a) Length over all..... | 93 feet 6 inches. | 118 feet 6 inches. | 94 feet 6 inches. | 95 feet. | 141 feet. |
| (b) Length on water line..... | 91 feet. | 102 feet. | 78 feet 3 inches. | 78 feet 3 inches. | 118 feet. |
| (c) Length of hull..... | 80 feet. | 104 feet. | 80 feet. | 80 feet. | 120 feet 6 inches. |
| (d) Beam over all..... | 20 feet 4 inches. | 19 feet 2 inches. | 18 feet 4 inches. | 18 feet 4 inches. | 27 feet. |
| (e) Beam on water line..... | 19 feet. | 19 feet. | 17 feet. | 17 feet. | 26 feet. |
| (f) Molded depth amidship..... | 4 feet 6 inches. | 4 feet. | 3 feet 9 inches. | 3 feet 9 inches. | 5 feet 1 inch. |
| (g) Draft forward..... | 2 feet 2 inches. | 2 feet 6 inches. | 3 feet 1 inch. | 3 feet 1 inch. | 3 feet. |
| (h) Draft aft..... | 3 feet 4 inches. | 2 feet 6 inches. | 2 feet 8 inches. | 2 feet 8 inches. | 3 feet 6 inches. |
| (i) Displacement (long tons). | 78. | 112. | 83. | 83. | 238. |
| 17. Engines: | | | | | |
| (a) Number and type of propelling engines. | 2 high-pressure engines. | 2 high-pressure, pump & valve. | 1 pair, horizontal high pressure. | 1 pair, horizontal high pressure. | 2 simple high pressure. |
| (b) Diameter and stroke. | 10 by 48 inches. | 9 inches diameter, 5-foot stroke. | 8½ inches by 4 feet. | 8½ inches by 4 feet. | 14 by 72 inches. |
| (c) Revolutions per minute, light. | 23. | 23. | 24. | 24. | 23. |
| (d) Revolutions per minute, towing. | 24. | 24. | 20. | 20. | 18. |
| 18. Paddle wheel: | | | | | |
| (a) Diameter..... | 13 feet 6 inches. | 14 feet. | 12 feet. | 12 feet. | 16 feet 10 inches. |
| (b) Number of buckets..... | 13. | 14. | 12. | 12. | 14. |

TABLE XVI.—Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name..... | Tenue. | Vega. | Venus. | Vulcan. | Warioto. |
|--|---|--|--|---|---|
| OPERATING COST—contd. | | | | | |
| 34. Cost of coal per long ton..... | 218 tons, at \$4.80..... | \$2.27..... | Kerosene, 8½ cents; lubricat-
ing, 33 to 60 cents..... | | \$2.50. |
| 35. Cost of oil per gallon..... | 12 cents for kerosene; 48 cents
lubricating..... | Kerosene, \$0.083..... | United States during year..... | | \$0.39. |
| 36. By whom and when re-
pairs were made..... | United States Engineers..... | Regular crew..... | | | |
| 37. Days under steam..... | 59..... | 126..... | | | |
| 38. Remarks on work done
by towboat during
year..... | <p><i>Remarks.</i></p> <p>Towed part of concrete
plant from New Orleans to
Natchez. Tender on mat-
tress construction, Lake Pal-
myra. Tender to concrete
plant in Hard Times and
Giles Bends, towing cement
and gravel. Towed mats
from Palmyra to Giles Bend.</p> | <p><i>Remarks.</i></p> <p>Muskingum River.</p> | <p><i>Remarks.</i></p> <p>Used as fleet tender, first
and second Mississippi River
districts, Memphis, Tenn.,
and on survey of Atchafa-
laya River.
Not kept separately.</p> | <p><i>Remarks.</i></p> <p>Not used during the year.
Sunk at West Memphis,
Ark., Mar. 20, 1918. Raised
Dec. 15, 1913, and rebuilt at
West Memphis, Ark., 1914-
15.</p> | <p>246.
General towing, and inspec-
tion trips.</p> |

| 1. Name | 2. District | Where Rock | Who? | Woodland | Wynoka |
|---|-------------|-------------------------------|-------------------------------------|--------------------------------|--|
| 3. Where built | | Louisville, Ky. | Milwaukee, Wis. | Second, Portland, Ore. | Mississippi River Commission, first and second districts, Memphis, Tenn.; Dubuque, Iowa. |
| 4. When built | | do. | Oshkosh, Wis. | Portland, Ore. | 1899. |
| 5. Builder | | 1908 | 1900 | 1915 | 15 months. |
| 6. Time to build | | United States | George Ryan | Joseph Supple | |
| 7. When purchased | | No record | 6 months. | 105 working days | |
| 8. From whom purchased | | | | | |
| 9. Purchase price | | | | | |
| 10. Material of hull | | Wood | Wood | Wood | Steel |
| 11. Material of house | | do. | do | do | Wood |
| 12. Contract cost | | \$2,066 | \$7,675 | \$10,978 | \$45,672 |
| 13. Cost of outfit | | \$1,000 | \$1,000 | \$1,023.39 | \$19,103.93 |
| 14. Present value | | | \$3,556.58 | \$16,000 | |
| 15. Hull: | | | | | |
| (a) Length over all | | 65 feet 10 inches | 89 feet | 97 feet | 199 feet 4 inches. |
| (b) Length on water line | | 54 feet | 83 feet | 81 feet | 167 feet 4 inches. |
| (c) Length of hull | | | 89 feet | 81 feet | 171 feet 6 inches. |
| (d) Beam over all | | 14 feet | 30 feet | 24 feet | 37 feet 8 inches. |
| (e) Beam on water line | | 11 feet 10 inches | 19 feet | 20 feet | 34 feet. |
| (f) Molded depth amidship | | 2 feet 6 inches | 4 feet 6 inches | 4 feet 6 inches | 5 feet 6 inches. |
| (g) Draft forward | | 1 foot 6 inches | 3 feet 2 inches | 1 foot 10 inches | 4 feet. |
| (h) Draft aft | | 2 feet 1 inch | 3 feet 2 inches | 2 feet | 4 feet 7 inches. |
| (i) Displacement (long tons) | | 28 | 114 | 75 | 360. |
| 17. Engines: | | | | | |
| (a) Number and type of propelling engines | | 2 piston valve | 2 horizontal, noncondensing | 2 horizontal, high pressure | 2 simple, high pressure, noncondensing. |
| (b) Diameter and stroke | | 6 inches by 2 feet | 10 inches diameter, 20-inch stroke. | 10½ by 48 inches | 22 inches diameter by 8-foot stroke. |
| (c) Revolutions per minute, light | | 18 | 75 | 32 | 15. |
| (d) Revolutions per minute, towing | | 16 | 75 | 28 | 11. |
| 18. Paddle wheel: | | | | | |
| (a) Diameter | | 8 feet 10 inches | 13 feet | 13 feet | 24 feet. |
| (b) Number of buckets | | 12 | 13 | 14 | 16. |
| (c) Length and width of buckets | | 7 feet 10 inches by 12 inches | 4 feet 5 inches by 18 inches | 15½ inches by 12 feet 8 inches | 24 feet long by 34 inches wide. |
| (d) Diameter of shaft | | 34 inches | 5½ inches | 6 inches | 12 inches diameter of inscribing circle. |
| (e) Number of wheel flanges | | | 4 | 4 | 5. |

TABLE XVI.—*Report of operations of tug and survey boats (paddle—steam vessels only) for the calendar year ending Dec. 31, 1916—Continued.*

| L. Name..... | Wave Rock. | Wgt. | Woodland. | Wynoka. |
|--|--|-----------------------------------|--|---|
| 19. Boilers: | | | | |
| (a) Number and type..... | 1, Phoenix Iron Works, steamboat type. | 2 tubular, externally fired... | 1 locomotive. | 6 Mississippi River type, return flue. |
| (b) Dimensions..... | 4 by 14 feet. | 12 feet long, 40 inches diameter. | 3 feet 9 inches diameter by 17 feet 8 inches long. | 30 feet long by 38 inches diameter. |
| (c) Number and diameter of flues in one boiler. | 56, 3 inches. | 50 of 24 inches. | 123 of 2 inches diameter. | 2 flues, 13 inches diameter. |
| (d) Total heating surface. | | 940 square feet. | 896 square feet. | 2,472 square feet. |
| (e) Total grate surface. | | 314 square feet. | Oil burner. | 99 square feet. |
| (f) Steam pressure. | 150 pounds. | 150 pounds. | 190 pounds. | |
| 20. Speed in miles per hour (average of up and down stream speed). | 6. | 9. | 10. | 14. |
| 21. Towing capacity..... | 3 small barges. | 350 tons, 5 miles per hour. | Unknown. | 10 barges loaded with 50 tons each. |
| 22. Number of men in crew..... | 4. | 5. | 4. | 17 single crew. |
| OPERATING COST. | | | | |
| 23. Pay roll..... | \$51.24 | \$3,523.77 | \$2,621.37 | \$3,147.25 |
| 24. Substances..... | | | 408.50 | 761.90 |
| 25. Supplies: | | | | |
| (a) Engine room..... | 2.30 | 12.51 | 48.84 | 67.87 |
| (b) Boiler room..... | | | 44.92 | 22.80 |
| (c) Miscellaneous..... | 50.66 | 527.29 | 1,707.96 | 1.80 |
| 26. Coal..... | | | | 3,919.23 |
| 27. Oil: | | | | |
| (a) Kerosene..... | .80 | 3.99 | 3.11 | 8.00 |
| (b) Lubricating..... | | 9.41 | 8.95 | 56.60 |
| 28. Ordinary repairs: | | | | |
| (a) Hull..... | 49.63 | 6.44 | | 175.00 |
| (b) Machinery..... | 84.18 | 14.23 | | 2,070.73 |
| 29. Extraordinary repairs: | | | | |
| (a) Hull..... | | 217.06 | | |
| (b) Machinery..... | | 137.03 | | |
| 30. Alterations and additions: | | | | |
| (a) Hull..... | | | | |
| (b) Machinery..... | | | | |
| 31. Laundry, ice, and miscellaneous expenses..... | | | | |
| 32. Office expenses..... | | 96.00 | 20.81 | 44.50 |
| | | | 626.55 | (*) |
| 33. Total..... | \$296.21 | \$4,047.33 | \$4,491.09 | \$10,273.03 |
| 34. Cost of coal per long ton..... | \$2.90 | \$4.84 | \$6.621 | \$2.80 |
| 35. Cost of oil per gallon..... | 8 to 18 cents. | 27.7 cents. | Illuminating, 11.96 cents; lubricating, 52.65 cents. | Kerosene, 8 to 10 cents; lubricating, 33 to 60 cents. |

| <p>4. DAYS UNDER TOW.</p> <p>28. Remarks on work done by towboat during year</p> | <p>12.</p> | <p>223.</p> <p>(1).</p> | <p>224.</p> <p>(1).</p> | <p>225.</p> <p>(1).</p> |
|--|--|--|---|---|
| <p>Remarks.</p> <p>Employed in miscellaneous towing and in siphoning water from hulls of floating plant at Dams Nos. 41 and 43 Ohio River, Idlesnoe Aug. 15.</p> | <p>Remarks.</p> <p>Transporting coal, towing and attending dredges, moving survey party from place to place and assisting in setting monuments and taking soundings, and assisting on repairs to locks, dams, etc., on Fox River, Wisconsin.</p> | <p>Remarks.</p> <p>Operating on the Willamette River, Oregon, Columbia River, Oregon and Washington, and on the Cowlicks and Lewis Rivers, Washington in tending plant, miscellaneous towing, snagging, survey, inspection and dispatch work.</p> <p>Fuel oil.</p> | <p>Remarks.</p> <p>Transferred from St. Louis district; received Aug. 19, 1916.</p> <p>Not kept separately.</p> <p>Repairs made at Government fleet from time to time as required.</p> <p>Towing stone and brush party; 42 barges towed upstream and 38 downstream; number of miles run, 3,300.</p> | <p>Remarks.</p> <p>Transferred from St. Louis district; received Aug. 19, 1916.</p> <p>Not kept separately.</p> <p>Repairs made at Government fleet from time to time as required.</p> <p>Towing stone and brush party; 42 barges towed upstream and 38 downstream; number of miles run, 3,300.</p> |

TABLE XVII.

GASOLINE LAUNCHES (SCREW).

4505

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916.

| Name..... | Abecon (power tender). | A lafia. | A laetosa. | Amelia. | A mitc. |
|---|---------------------------|-----------------------------|---------------------------|-----------------------|----------------------------|
| 1. District..... | Wilmington, Del. | Jacksonville, Fla. | Pittsburgh, Pa. | Savannah, Ga. | New Orleans, La. |
| 2. Where built..... | Hollyoak, Del. | South Jacksonville, Fla. | New York, N. Y. | Long Island, N. Y. | Do. |
| 3. When built..... | 1914..... | 1914..... | 1887..... | 1901..... | 1912..... |
| 4. Builder..... | About 6 weeks. | Gibbs Gas Engine Co. | ..... | Unknown. | Gibbens & Stream. |
| 5. Time to build..... | August, 1914..... | Jacksonville, Fla. | Cincinnati, Ohio. | do. | Unknown. |
| 6. Where purchased..... | Builder..... | 1914..... | 1902..... | Long Island, N. Y. | New Orleans, La. |
| 7. When purchased..... | ..... | Gibbs Gas Engine Co. | ..... | Unknown. | 1912..... |
| 8. From whom purchased..... | ..... | ..... | \$740..... | \$2,500..... | Gibbens & Stream. |
| 9. Purchase price..... | \$325..... | \$479..... | ..... | \$2,500..... | \$300..... |
| 10. Contract cost..... | \$325..... | ..... | ..... | ..... | ..... |
| 11. Complete cost with outfit..... | \$725..... | \$600..... | \$300..... | \$1,500..... | \$300..... |
| 12. Present value..... | Wood..... | Wood..... | Cedar..... | Wood..... | Wood..... |
| 13. Hull: | (a) Material of hull..... | 18 feet..... | 31 feet 6 inches..... | 33 feet..... | 20 feet 11 inches..... |
| (b) Length over all..... | 20 feet..... | 17 feet..... | 27 feet..... | 33 feet 1 inch..... | 20 feet 7 inches..... |
| (c) Length on water line..... | 6 feet 6 inches..... | 5 feet 10 inches..... | 7 feet..... | 9 feet..... | 4 feet 6 inches..... |
| (d) Beam over all..... | 5 feet 6 inches..... | 5 feet 4 inches..... | 5 feet 2 inches..... | 7 feet 6 inches..... | 4 feet 6 inches..... |
| (e) Beam on water line..... | 3 feet..... | 2 feet 10 inches..... | 3 feet 9 inches..... | 8 feet 1 inch..... | 3 feet 10 inches..... |
| (f) Depth of hull forward..... | 2 feet 9 inches..... | 2 feet 1 inch..... | 2 feet 10 inches..... | 7 feet 11 inches..... | 2 feet 9 inches..... |
| (g) Depth of hull amidships..... | 2 feet 7 inches..... | 2 feet 7 inches..... | 3 feet 1 inch..... | 7 feet 8 inches..... | 2 feet 8 inches..... |
| (h) Draught forward..... | 1 foot 3 inches..... | 1 foot..... | 1 foot..... | 2 feet 4 inches..... | 11 inches..... |
| (i) Draught at..... | 1 foot 11 inches..... | 1 foot 8 inches..... | 2 feet 8 inches..... | 3 feet..... | 5 inches..... |
| (j) Draught to bottom of propeller..... | 1 foot 9 inches..... | 1 foot 7 inches..... | 2 feet 6 inches..... | 2 feet 9 inches..... | 1 foot 10 1/2 inches..... |
| (k) Depth of keel from bottom of outside of planking..... | 3 inches..... | 3 inches..... | 4 inches..... | 6 inches..... | 1 inch..... |
| (m) Displacement (long tons)..... | ..... | 0.65..... | 7..... | 4.5..... | 1.21..... |
| (n) Speed in statute miles per hour..... | About 8..... | 7.1..... | 8..... | 8..... | 6..... |
| 14. House: | None..... | None..... | 21 feet 1 1/2 inches..... | 22 feet 1 inch..... | No house..... |
| (a) Length..... | ..... | ..... | 7 feet 8 inches..... | 7 feet 6 inches..... | ..... |
| (b) Width..... | ..... | ..... | 3 feet 9 inches..... | 4 feet..... | ..... |
| (c) Height above deck..... | ..... | ..... | ..... | ..... | ..... |
| (d) Accommodations..... | ..... | Stern and thwart seats..... | 50..... | 4..... | Seating capacity of 4..... |

1A. Motors:

| (a) Number | 1..... | 1..... | 1..... | 1..... | 1..... |
|--|-----------------|--|--|--|---|
| (b) Type | 4 cycle..... | 3 cylinder, 2 cycle..... | 4 cycle, make and break, gasoline..... | 4 cycle, make and break, gasoline..... | 1..... |
| (c) When built | 1914..... | 1908..... | 1916..... | 1916..... | Unknown..... |
| (d) Make | Harris..... | Ferro Machinery & Foundry Co..... | Murray & Tregurtha..... | Murray & Tregurtha..... | Cable, Perfection Motor Co., Detroit, Mich..... |
| (e) Number of cylinders (one end) | 2..... | 3..... | 2..... | 2..... | 2..... |
| (f) Diameter of cylinder | 5 inches..... | 4 inches..... | 6½ inches..... | 6½ inches..... | 8½ inches..... |
| (g) Stroke | 5½ inches..... | 4½ inches..... | 8 inches..... | 8 inches..... | 3½ inches..... |
| (h) Revolutions per minute | 335..... | 360..... | 425..... | 425..... | 450..... |
| (i) Rated brake horsepower (total) | 9..... | 17..... | 15-18..... | 15-18..... | 8..... |
| (j) Weight of one motor | 475 pounds..... | 480 pounds..... | 1,000 pounds..... | 1,000 pounds..... | 250 pounds..... |
| 1A. Propeller: | | | | | |
| (a) Number of blades | 2..... | 3..... | 3..... | 3..... | 3..... |
| (b) Diameter | 20 inches..... | 18 inches..... | 26 inches..... | 26 inches..... | 16 inches..... |
| (c) Pitch | 30 inches..... | 20 inches..... | 34 inches..... | 34 inches..... | 20 inches..... |
| (d) Diameter of shaft | 1 inch..... | 1½ inches..... | 2 inches..... | 2 inches..... | 1 inch..... |
| 17. Hoisting system: | | | | | |
| (a) Type | None..... | None..... | None..... | None..... | None..... |
| (b) Size of hoister | | | | | |
| (c) Number of radiators | | | | | |
| 18. Electric-light plant: | | | | | |
| (a) Make | None..... | None..... | None..... | None..... | None..... |
| (b) Type of motor | | | | | |
| (c) Type of horse power | | | | | |
| (d) Revolutions per minute | | | | | |
| (e) Capacity of generator in kilowatts | | | | | |
| (f) Number of lights | | | | | |
| (g) Average candle-power per light | | | | | |
| (h) Diameter of lamp for light | | | | | |
| 19. Number of men in crew | 1..... | None; taken from regular look force..... | None..... | None..... | Do..... |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Abasco (power tender). | A lafia. | A lbotroas. | A mella. | A mite. |
|--|---|---|--|---|--|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | | \$400.00 | \$30.33 | (¹) \$153.06 | ..... |
| 21. Subsistence..... | | (¹) 231.10 | 20.30 | 233.89 | ..... |
| 22. Fuel..... | \$54.54 | 54.75 | 13.34 | 45.07 | \$3.51 |
| 23. Supplies (machinery)..... | 5.40 |  |  |  | ..... |
| 24. Repairs: |  |  |  |  | ..... |
| (a) Hull..... | | 77.18 | 14.00 | 24.50 | ..... |
| (b) Machinery..... | | 95.00 | 12.65 | 126.91 | 46.74 |
| 25. Additions and alterations..... | | \$ 288.50 | | \$ 868.00 | ..... |
| 26. Miscellaneous..... | | 27.65 | 5.26 | 131.12 | ..... |
| 27. Total..... | \$59.94 | | | | \$50.25 |
| 28. Approximate number of miles run during year..... | Unknown..... | 4,266..... | 120..... | 6,643..... | 84..... |
| 29. Number of days in commission..... | 366..... | | 30..... | Unknown..... | 7..... |
| 30. Cost of fuel per gallon..... | 21 to 23 cents..... | 24 to 25 cents..... | 21 to 23 cents..... | 16.9 cents..... | 13½ cents..... |
| | <i>Remarks.</i>
Used as power tender to seagoing hopper dredge Abasco at Abasco Inlet and Cold Spring Inlet, N. J., and operated by members of her crew. | <i>Remarks.</i>
Operated on Hillsboro Bay, Sarasota Bay, and Manatee River, Fla., as dispatch and light towboat for United States dredges Barnard and Sarasota.
¹ Subsistence furnished from United States dredges Barnard and Sarasota.
² Includes \$263 for new 8-horsepower Regal engine. | <i>Remarks.</i>
In pools Nos. 10 and 11, Ohio River. The operations consisted of towing work boats, flats, and rafts while placing horses and wickets in dams; hauling freights from wharfbat and freight station to locks, and taking soundings for dredging, etc. | <i>Remarks.</i>
Used in making surveys under Brunswick office and also for inspection work.
¹ No regular crew; boat operated by employees of survey party.
² New engine purchased and installed. | <i>Remarks.</i>
Transportation of material to and from lock and inspections on Bayou Teche in vicinity of lock. |

| Name..... | Age. | Analogue. | Asimilit. | Arid. | Arrow. |
|---|---------------------------------|-----------------------|------------------------|-----------------------------------|--------------------------------|
| 1. District..... | Washington, D. C..... | Galveston, Tex..... | St. Paul, Minn..... | Cleveland, Ohio..... | Montgomery, Ala..... |
| 2. Where built..... | Rebuilt, Washington, D. C..... | 1914..... | 1914-15..... | Adairsville, Ohio..... | Fort Pickens, Fla..... |
| 3. When built..... | September, 1916..... | 2 weeks..... | United States..... | 6 months..... | U. S. Engineer Department..... |
| 4. Builder..... | Hired labor..... | 24 months..... | 2 months..... | ..... | 3 months..... |
| 5. Time to build..... | Hull purchased Regent, Va..... | ..... | ..... | ..... | Built by hired labor..... |
| 6. Where purchased..... | Hull 1916..... | ..... | ..... | ..... | ..... |
| 7. When purchased..... | Hull purchased D. H. Baker..... | ..... | ..... | ..... | ..... |
| 8. From whom purchased..... | Hull \$150..... | ..... | ..... | ..... | ..... |
| 9. Purchase price..... | Cost of rebuilding, \$775..... | \$2,592.81..... | \$5,933.02..... | \$500 without present engine..... | \$1,900..... |
| 10. Contract cost..... | ..... | ..... | ..... | ..... | ..... |
| 11. Complete cost with outfit..... | ..... | ..... | ..... | ..... | ..... |
| 12. Present value..... | \$500..... | \$2,000..... | \$4,293..... | \$300 without engine..... | \$1,600..... |
| 13. Hull: | Virginia pine logs..... | Wood..... | Wood..... | Wood..... | Wood..... |
| (a) Material of hull..... | 20 feet 3 inches..... | 28 feet..... | 55 feet..... | 36 feet..... | 31 feet..... |
| (b) Length over all..... | 28 feet, 6 inches..... | 28 feet 6 inches..... | 54 feet 2 inches..... | 31 feet 6 inches..... | 28 feet 6 inches..... |
| (c) Length on water line..... | 6 feet 6 inches..... | 8 feet 2 inches..... | 11 feet 10 inches..... | 8 feet 1 inch..... | 7 feet..... |
| (d) Beam over all..... | 4 feet 1 inch..... | 7 feet 4 inches..... | 11 feet 2 inches..... | 7 feet 3 inches..... | 7 feet..... |
| (e) Beam on water line..... | 3 feet..... | 5 feet 6 inches..... | 4 feet 3 inches..... | 5 feet 1 inch..... | 4 feet 5 inches..... |
| (f) Depth of hull forward..... | 2 feet 5 inches..... | 3 feet 6 inches..... | 3 feet 9 inches..... | 4 feet 7 inches..... | 4 feet..... |
| (g) Depth of hull amidships..... | 2 feet 8 inches..... | 3 feet..... | 2 feet 3 inches..... | 3 feet 6 inches..... | 4 feet 2 inches..... |
| (h) Depth of hull aft..... | 8 inches..... | 1 foot 6 inches..... | 1 foot 3 inches..... | 8 inches..... | 1 foot..... |
| (i) Draft forward..... | 2 feet 3 inches..... | 2 feet 2 inches..... | 1 foot 4 inches..... | 2 feet 8 inches..... | 2 feet..... |
| (j) Draft at..... | 1 foot 10 inches..... | 2 feet..... | 1 foot 9 inches..... | 2 feet 6 inches..... | 1 foot 10 inches..... |
| (k) Draft to bottom of propeller..... | 4 inches..... | 8 inches..... | 3 feet 9 inches..... | 4 inches..... | 24 inches..... |
| (l) Depth of keel from bottom of outside of planking..... | 24..... | 6 tons..... | 11..... | 6..... | 2..... |
| (m) Displacement (long tons)..... | 6..... | 94..... | 8..... | 74..... | 8..... |
| (n) Speed, in statute miles per hour..... | None..... | 15 feet 6 inches..... | 31 feet 2 inches..... | None..... | 20 feet (canopy top)..... |
| 14. House: | ..... | 8 feet 2 inches..... | 8 feet 8 inches..... | 5 feet..... | 5 feet..... |
| (a) Length..... | ..... | Raised deck..... | 6 feet 10 inches..... | 3 feet 6 inches..... | 3 feet 6 inches..... |
| (b) Width..... | ..... | 2 men..... | Seat 20 men..... | Seat 14 men..... | Seat 14 men..... |
| (c) Height above deck..... | ..... | ..... | ..... | ..... | ..... |
| (d) Accommodations..... | ..... | ..... | ..... | ..... | ..... |

TABLE XVII.—*Report of operations of gasoline launches (screw) during calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Ass. | Anahuac. | Asmuth. | Arld. | Arrow. |
|---|------------------------------------|---------------------------|-------------------------------------|-------------------------------|------------------------------|
| 15. Motors: | | | | | |
| (a) Number..... | 1 | 1 | 2 | 1 | 1 |
| (b) Type..... | 2 cycle..... | 4 cycle, medium duty..... | 4 cylinder 4 cycle, heavy duty..... | 4 cycle gas..... | Make and break, medium duty. |
| (c) When built..... | 1914..... | 1914..... | 1914..... | 1908..... | 1910. |
| (d) Make..... | Camden Anchor Rockland Machine Co. | Sterling..... | H. C. Doman Co. | Buffalo..... | Buffalo Gasoline Motor Co. |
| (e) Number of cylinders (1 engine)..... | 1 | 4 | 4 | 2 | 4 |
| (f) Diameter of cylinder..... | 4 inches..... | 5½ inches..... | 7 inches..... | 6 inches..... | 5½ inches. |
| (g) Stroke..... | do..... | 6 inches..... | 9 inches..... | 8 inches..... | 5 inches. |
| (h) Revolutions per minute..... | 600..... | 250 to 800..... | 350..... | 300 (approximate)..... | 525. |
| (i) Rated brake horsepower (total)..... | 3 | 30 to 50..... | 80..... | 12..... | 15. |
| (j) Weight of 1 motor..... | 205 pounds..... | 900 pounds..... | 2,867 pounds..... | 800 pounds (approximate)..... | 675 pounds. |
| 16. Propeller: | | | | | |
| (a) Number of blades..... | 3 | 3 | 3 | 3 | 3 |
| (b) Diameter..... | 16 inches..... | 20 inches..... | 32 inches..... | 24 inches..... | 18 inches. |
| (c) Pitch..... | 18 inches..... | 24 inches..... | 36 inches..... | 30..... | 24. |
| (d) Diameter of shaft..... | 1 inch..... | 1½ inches..... | 2 inches..... | 1½ inches..... | 1½ inches. |
| 17. Heating system: | | | | | |
| (a) Type..... | None..... | None..... | No heating system..... | None..... | None. |
| (b) Size of heater..... | ..... | ..... | ..... | ..... | ..... |
| (c) Number of radiators..... | ..... | ..... | ..... | ..... | ..... |
| 18. Electric-light plant: | | | | | |
| (a) Make..... | None..... | None ¹ | No electric-light plant..... | None..... | None. |
| (b) Type of motor..... | ..... | ..... | ..... | ..... | ..... |
| (c) Brake horsepower..... | ..... | ..... | ..... | ..... | ..... |
| (d) Revolutions per minute..... | ..... | ..... | ..... | ..... | ..... |
| (e) Capacity of generator in kilowatts..... | ..... | ..... | ..... | ..... | ..... |
| (f) Number of lights..... | ..... | ..... | ..... | ..... | ..... |
| (g) Average candle-power per light..... | ..... | ..... | ..... | ..... | ..... |
| (h) Diameter of searchlight..... | ..... | ..... | ..... | ..... | ..... |
| 19. Number of men in crew..... | 1 | 3 | 3 | 1 | 2 |

FLOATING PLANT.

4511.

OPERATING COST.

| | | | | | |
|---|-----------------|----------|------------|-------|------------|
| 20. Pay roll..... | () | \$875.00 | \$687.81 | () | \$1,118.80 |
| 21. Subsistence..... | () | 8.89 | 74.05 | ..... | 171.00 |
| 22. Fuel..... | \$14.24 | 640.14 | 205.00 | ..... | 349.37 |
| 23. Supplies (machinery)..... | 6.78 | 53.63 | 152.94 | ..... | 17.50 |
| 24. Repairs: | | | | | |
| (a) Hull..... | 225.38 | 115.40 | 9.00 | ..... | 170.77 |
| (b) Machinery..... | 79.62 | 104.59 | 162.60 | ..... | ..... |
| 25. Additions and alterations..... | 26.86 | 57.25 | 350.14 | ..... | ..... |
| 26. Miscellaneous..... | 5.78 | 34.63 | ..... | ..... | 29.19 |
| Total..... | | \$358.66 | \$1,641.84 | ..... | \$1,881.33 |
| 27. Approximate number of miles run during year..... | 348 | 2,500 | 1,330 | 50 | 1,954 |
| 28. Number of days in commission..... | 267 | ..... | 138 | ..... | 321 |
| 29. Cost of fuel per gallon..... | 20 to 25 cents. | ..... | 15 cents | ..... | \$0.215. |
| <div> <div> <div> <div> <div>Remarks.</div> <div>A new hull was purchased. The installation of engine and accessories was done by hired labor. Used only occasionally on surveys and miscellaneous work over all waterways of this district. Operated by a member of survey party.</div> <div>! None.</div> </div> </div> <div> <div>Remarks.</div> <div>! Batteries charged ashore. Inspection boat.</div> </div> <div> <div>Remarks.</div> <div>Mississippi and Leach Rivers, Minn.</div> </div> <div> <div>Remarks.</div> <div>! This launch was operated only a few times during the season and then by the crew of other boats. No charges were made against this item of plant.</div> </div> <div> <div>Remarks.</div> <div>This plant was operated at Pensacola Harbor, Fla., between Warrington, Forts Barrancas, Pickens, and McRee, 60-inch Searchlight, Secondary Stations, and Pensacola, Fla.</div> </div> </div> </div> | | | | | |

TABLE XVII.—*Report of operations of gasoline launches (screw) during calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Avell. | Eastrop. | Bestice. | Beaumont. | Bel. |
|--|-----------------------------------|-----------------------|--|------------------------------|--|
| 1. District..... | Washington, D. C..... | Galveston, Tex..... | New Orleans (fourth Missis-
sippi River)..... | Dallas, Tex..... | Washington, D. C. |
| 2. Where built..... | Annapolis, Md..... | Cedar Bayou, Tex..... | St. Louis, Mo..... | Houston Heights, Tex..... | Do. |
| 3. When built..... | August to December, 1916..... | 1908..... | 1908..... | 1913..... | 1912. |
| 4. Builder..... | Chance Marine Construction
Co. | E. J. Sjollander..... | Fred Madari..... | Bennett Construction Co..... | Hull, C. F. Bennett Motor,
Buffalo Gas Motor Co.
Installed by G. W. Fort-
berg. |
| 5. Time to build..... | 135 days..... | 2½ months..... | 3 months..... | 6½ months..... | Unknown. |
| 6. Where purchased..... | | | New Orleans, La..... | | Washington, D. C. |
| 7. When purchased..... | | | 1908..... | | 1912. |
| 8. From whom purchased..... | | | | | Made as stated above. |
| 9. Purchase price..... | | | | | \$378.48 is total cost of boat. |
| 10. Contract price..... | \$3,831..... | \$4,300..... | \$1,750..... | \$6,738.50..... | Do. |
| 11. Complete cost with out-
fit..... | \$4,080..... | | \$1,750..... | \$6,738.50..... | |
| 12. Present value..... | \$4,500..... | \$3,000..... | \$250..... | | \$270. |
| 13. Hull: | | | | | |
| (a) Material of hull..... | Georgia pine (1½ inches thick) | Wood..... | Wood..... | Wood..... | White cedar. |
| (b) Length over all..... | 36 feet..... | 46 feet 6 inches..... | 30 feet..... | 58 feet 2½ inches..... | 16 feet 4 inches. |
| (c) Length on water
line..... | 32 feet 9 inches..... | 42 feet 6 inches..... | 28 feet 6 inches..... | 54 feet 1½ inches..... | 16 feet. |
| (d) Beam over all..... | 10 feet 6 inches..... | 11 feet 6 inches..... | 6 feet 6 inches..... | 13 feet 7 inches..... | 4 feet 4 inches. |
| (e) Beam on water
line..... | 9 feet 4 inches..... | 11 feet..... | 6 feet 2 inches..... | 13 feet 1½ inches..... | 3 feet 4 inches. |
| (f) Depth of hull for-
ward..... | 6 feet 1 inch..... | 5 feet..... | 4 feet 6 inches..... | 8 feet 5½ inches..... | 2 feet. |
| (g) Depth of hull
amidships..... | 4 feet 5 inches..... | 4 feet 9 inches..... | 3 feet 2 inches..... | 6 feet 9½ inches..... | 1 foot 9 inches. |
| (h) Depth of hull aft..... | 5 feet..... | 4 feet..... | 2 feet 5 inches..... | 7 feet 11½ inches..... | 1 foot 10½ inches. |
| (i) Draft forward..... | 2 feet 3½ inches..... | 2 feet..... | 2 feet..... | 2 feet 10 inches..... | 9 inches. |
| (j) Draft aft..... | 3 feet 5½ inches..... | 3 feet 8 inches..... | 4 inches..... | 5 feet..... | 1 foot 5 inches. |
| (k) Draft to bottom
of propeller..... | 3 feet 4 inches..... | 3 feet 6 inches..... | 1 foot 10 inches..... | 4 feet 10½ inches..... | 1 foot 6 inches. |
| (l) Depth of keel
from bottom of
outside of
planking..... | 4 inches..... | 6 inches..... | 1½ inches..... | 7½ inches..... | 1½ inches. |
| (m) Displacement
(long tons)..... | 9..... | 16..... | 2.8..... | 32..... | 8. |
| (n) Speed in statute
miles per hour..... |do..... | 9½..... | 8..... | 10..... | 8. |

| | | | | | | |
|----------------------------|---|----------------------------|--------------------------|-------------------------|------------------------|----------------------------|
| 14. House: | (a) Length..... | 13 feet 8 inches..... | 19 feet 5 inches..... | 15 feet..... | 29 feet 11 inches..... | None. |
| | (b) Width..... | 7 feet 8 inches..... | 7 feet 8 inches..... | 6 feet..... | 6 feet..... | |
| | (c) Height above deck..... | 5 feet 6 inches..... | 4 feet..... | 4 feet..... | 7 feet..... | |
| | (d) Accommodations..... | None..... | 3 man..... | 6 persons..... | 3..... | |
| 15. Motors: | (a) Number..... | 1..... | 1..... | 1..... | 1..... | 1..... |
| | (b) Type..... | 4-cycle jump spark..... | 4-cycle, heavy duty..... | 4-cycle..... | 4-cycle..... | 4-cycle..... |
| | (c) When built..... | 1916..... | 1916..... | 1906..... | 1913..... | 1913..... |
| | (d) Make..... | Murray & Tregurtha Co..... | Buffalo..... | Standard Engine Co..... | Buffalo..... | Buffalo Gasoline Motor Co. |
| | (e) Number of cylinders..... | 4..... | 6..... | 2..... | 6..... | 2..... |
| | (f) Diameter of cylinder..... | 6½ inches..... | 7 inches..... | 6 inches..... | 7 inches..... | 3 inches..... |
| | (g) Stroke..... | 8-inch..... | 9 inches..... | 8 inches..... | 9 inches..... | 4 inches..... |
| | (h) Revolutions per minute..... | 400..... | 350-400..... | 360..... | 350..... | 450..... |
| | (i) Rated brake horsepower..... | 40..... | 60-70..... | 18..... | 60-70..... | 2..... |
| | (j) Weight of one motor..... | 2,500 pounds..... | 4,900 pounds..... | 1,350 pounds..... | 4,850 pounds..... | 250 pounds..... |
| 16. Propeller: | (a) Number of blades..... | 3..... | 3..... | 3..... | 3..... | 3..... |
| | (b) Diameter..... | 32 inches..... | 38 inches..... | 23 inches..... | 44 inches..... | 13 inches..... |
| | (c) Pitch..... | do..... | do..... | 36 inches..... | 56 inches..... | 26 inches..... |
| | (d) Diameter of shaft..... | 2 inches..... | 2½ inches..... | 1½ inches..... | 2½ inches..... | ½ inch..... |
| 17. Heating system: | (a) Type..... | None..... | None..... | None..... | None..... | None..... |
| | (b) Size of heater..... | do..... | do..... | do..... | do..... | do..... |
| | (c) Number of radiators..... | do..... | do..... | do..... | do..... | do..... |
| 18. Electric-light plant: | (a) Make..... | do..... | Smile..... | None..... | Richardson..... | None..... |
| | (b) Type of motor..... | do..... | 1 cylinder, 4-cycle..... | do..... | Direct current..... | do..... |
| | (c) Brake horsepower..... | do..... | 2..... | do..... | do..... | do..... |
| | (d) Revolutions per minute..... | do..... | 750..... | do..... | do..... | do..... |
| | (e) Capacity of generator in kilowatts..... | do..... | ½ kilowatt..... | do..... | do..... | do..... |
| | (f) Number of lights..... | do..... | 10..... | do..... | do..... | do..... |
| | (g) Average candle-power per light..... | do..... | 2..... | do..... | do..... | do..... |
| | (h) Diameter of searchlight..... | do..... | 9 inches..... | do..... | do..... | do..... |
| 19. Number of men in crew: | (a) Number of men in crew..... | 1..... | 3..... | do..... | do..... | do..... |
| | (b) Number of men in crew..... | 1..... | 3..... | do..... | do..... | do..... |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—(continued).

| Name. | Averill. | Bastrop. | Beartree. | Beaumont. | Bell. |
|--|---|--|--|---|---|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | (1) | \$2,338.72 | (1) | \$1,497.00 | (1) |
| 21. Subsistence..... | (1) | 574.06 | (1) | 1,517.99 | \$4.06 |
| 22. Fuel..... | (1) | 1,775.53 | 208.00 | 134.36 | 3.48 |
| 23. Supplies (machinery)..... | (1) | 142.08 | 34.20 | | |
| 24. Repairs: | | | | | |
| (a) Hull..... | (1) | 559.71 | 42.34 | 3.00 | 10.30 |
| (b) Machinery..... | (1) | 702.80 | 92.64 | 474.39 | 25.00 |
| 25. Additions and alterations..... | (1) | 187.98 | | | 1.35 |
| 26. Miscellaneous..... | (1) | 307.40 | | | 4.70 |
| 27. Total..... | | \$6,598.28 | \$374.18 | \$3,626.74 | \$48.89 |
| 28. Approximate number of miles run during year..... | None..... | | 4,500..... | 8,000..... | 246..... |
| 29. Number of days in commission..... | do..... | | 270..... | 285..... | 33..... |
| 30. Cost of fuel per gallon..... | do..... | | 20½ cents..... | \$0.189..... | 20 to 25 cents..... |
| | Remarks. | Remarks. | Remarks. | Remarks. | Remarks. |
| | Built under contract with Chance Marine Construction Co. between Aug. 22 and Dec. 31, at cost of \$3,931. Tests and trial runs provided for in contract were in progress at end of year, but no actual work was done by this launch during the year.
None. | Operated on the inland waterway tender to San Bernard. | As tender to survey party between Vicksburg and New Orleans.
Operated by members of survey party, and no separate account of pay roll and subsistence kept. | Operated as dredge tender to dredge Orange. | Tender for tug Castle. Operated by a member of crew of Castle. Used only occasionally.
None. |

| Name..... | Build. | Birth. | Black Recl. | Booy. | Boiler. |
|---|---------------------------|---------------------------|----------------------|----------------------------|---|
| 1. District..... | Mobile, Ala..... | St. Louis, Mo..... | Buffalo, N. Y..... | New Orleans, La..... | St. Louis, Mo., Mississippi River Commission, Grafton, Ill. September, 1913. Peter Freiman. |
| 2. Where built..... | Gulfport, Miss..... | Grafton, Ill..... | do..... | do..... | do..... |
| 3. When built..... | 1909..... | 1911..... | 1911..... | 1913..... | 1913..... |
| 4. Builder..... | Thomas M. Favre..... | Ripley Steel Boat Co..... | Charles McDuff..... | Arthur Duvie..... | Peter Freiman. |
| 5. Time to build..... | 4 months..... | 7 weeks..... | 3 months..... | About 2 months..... | September, 1913. |
| 6. Where purchased..... | Grafton, Ill..... | Grafton, Ill..... | Buffalo, N. Y..... | New Orleans, La..... | Grafton, Ill. |
| 7. When purchased..... | ..... | ..... | September, 1911..... | Duvie Bros..... | 1913. |
| 8. From whom purchased..... | ..... | ..... | Charles McDuff..... | ..... | Peter Freiman. |
| 9. Purchase price..... | \$3,098.80..... | \$319..... | \$600..... | \$325..... | \$333.75. |
| 10. Contract cost..... | \$2,215..... | \$619..... | \$640..... | \$422.15..... | \$333.75. |
| 11. Complete cost with outfit..... | \$1,900..... | \$325..... | \$375..... | \$310..... | \$295. |
| 12. Present value..... | Wood..... | Steel..... | Wood..... | Wood..... | Wood. |
| 13. Hull: | (a) Material of hull..... | 28 feet..... | 25 feet..... | 14 feet..... | 25 feet. |
| (b) Length over all..... | 33 feet..... | 27 feet..... | 24 feet..... | 13 feet 9 inches..... | 24 feet 10 inches. |
| (c) Length on water line..... | 13 feet..... | 6 feet 6 inches..... | 7 feet 3 inches..... | 4 feet 5 inches..... | 5 feet. |
| (d) Beam over all..... | 9 feet..... | 5 feet 11 inches..... | 6 feet..... | 2 feet 9 inches..... | 3 feet 3 inches. |
| (e) Beam on water line..... | 5 feet 6 inches..... | 2 feet 8 inches..... | 4 feet 3 inches..... | 3 feet 2 inches..... | 2 feet. |
| (f) Depth of hull forward..... | 4 feet 7 inches..... | 2 feet 6 inches..... | 4 feet..... | 2 feet 8 inches..... | 1 foot 11 inches. |
| (g) Depth of hull amidships..... | 2 feet 3 inches..... | 2 feet 5 inches..... | 4 feet 3 inches..... | 2 feet 10 inches..... | 1 foot 6 inches. |
| (h) Depth of hull aft..... | 2 feet 5 inches..... | 41 inches..... | 1 foot..... | 94 inches..... | 5 inches. |
| (i) Draft forward..... | 4 feet 1 inch..... | 1 foot 6 inches..... | 2 feet 3 inches..... | 1 foot 4 inches..... | 5 inches. |
| (j) Draft aft..... | 3 feet 5 inches..... | 1 foot 6 inches..... | 2 feet..... | 1 foot 64 inches..... | 1 foot 7 inches. |
| (k) Draft to bottom of propeller..... | 4 inches..... | 4 inch..... | 6 to 14 inches..... | 3 inches..... | 10 inches. |
| (l) Depth of keel from bottom of outside of planking..... | 25..... | 14..... | 1..... | 1 ton..... | 0.9. |
| (m) Displacement (long tons)..... | 8..... | 8..... | 8..... | 71..... | About 8. |
| (n) Speed in statute miles per hour..... | ..... | ..... | ..... | ..... | ..... |
| 14. House: | 28 feet 10 inches..... | None..... | None..... | No house..... | ..... |
| (a) Length..... | 7 feet 8 inches..... | ..... | ..... | ..... | ..... |
| (b) Width..... | 3 feet 7 inches..... | ..... | ..... | ..... | ..... |
| (c) Height above deck..... | 4 man..... | ..... | ..... | Seating capacity of 4..... | ..... |
| (d) Accommodations..... | ..... | ..... | ..... | ..... | ..... |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916.

| Name..... | Blktd. | Blktd. | Black Rect. | Boesf. | Bolter. |
|---|-----------------------|-----------------------|-----------------------|----------------------------|-----------------------|
| 14. Motors: | | | | | |
| (a) Number..... | 1. 4-cycle | 1. 4-cycle | 1. 4-cycle | 1. "A" 24 to 5 horsepower. | 1. 4-cycle. |
| (b) Type..... | 1909. | 1909. | About 1909. | Unknown. | 1913. |
| (c) When built..... | Wolverine. | Wolverine. | Henschel-Spillman. | Scripps Motor Co. | Missouri Engine Works |
| (d) Make..... | 2. 3. | 2. 3. | 4. | 1. | 2. |
| (e) Number of cylinders (one engine)..... | 84 inches | 84 inches | 4 inches | 44 inches | 44 inches. |
| (f) Diameter of cylinder..... | 9 inches | 9 inches | 5 inches | 5 inches | 5 inches. |
| (g) Stroke..... | 240 | 240 | 800 | 600 to 800. | 500 to 600. |
| (h) Revolutions per minute..... | 26 | 15 | 15 | 24 to 3. | 3. |
| (i) Rated brake horsepower (total)..... | 3,545 pounds | 425 pounds | 340 pounds | Unknown | 500 pounds. |
| (j) Weight of one motor..... | | | | | |
| 15. Propeller: | | | | | |
| (a) Number of blades..... | 4. | 2. | 2. | 3. | 3. |
| (b) Diameter..... | 33 inches | 20 inches | 12 inches | 16 inches | 16 inches. |
| (c) Pitch..... | 28 inches | do. | 24 inches | 18 inches | 20 inches. |
| (d) Diameter of shaft..... | 24 inches | 14 inches | 14 inches | 1 inch. | 1 inch. |
| 17. Heating system: | | | | | |
| (a) Type..... | None. | None. | None. | None. | None. |
| (b) Size of heater..... | | | | | |
| (c) Number of radiators..... | | | | | |
| 18. Electro-light plant: | | | | | |
| (a) Make..... | Dayton. | Dayton. | None. | None. | None. |
| (b) Type of motor..... | E. | E. | None. | None. | None. |
| (c) Brake horsepower..... | 1,300 | 1,300 | 1,300 | 1,300 | 1,300 |
| (d) Revolutions per minute..... | Less than 1 kilowatt. | Less than 1 kilowatt. | Less than 1 kilowatt. | Less than 1 kilowatt. | Less than 1 kilowatt. |
| (e) Capacity of generator in kilowatts..... | | | | | |
| (f) Number of lights..... | | | | | |
| (g) Average candlepower per light..... | | | | | |
| (h) Diameter of reflector..... | | | | | |
| 19. Number of hours in service..... | | | | | |

4517

Digitized by Google

TABLE XVII.—*Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Bonne Femme. | Bon Homme. | Branswick. | Barton 22. | Caddo. |
|--|-----------------------|----------------------------|--------------------------|------------------------|-------------------|
| 1. District..... | Kansas City, Mo. | Kansas City, Mo. | Savannah, Ga. | Cleveland, Ohio. | Dallas, Tex. |
| 2. Where built..... | Grafton, Ill. | Gasconade, Mo. | Charleston, S. C. | do. | Fulton, Ark. |
| 3. Year built..... | 1908. | 1916. | 1914-15. | 1906. | 1911. |
| 4. Builder..... | Ripley Steel Boat Co. | U. S. Engineer Department. | United States Navy Yard. | Borden & Seileck Co. | United States. |
| 5. Name..... | Unknown. | 15 months (approximately). | 9 months. | do. | 1 month. |
| 6. Time to build..... | Grafton, Ill. | 1908. | Charleston, S. C. | Cleveland, Ohio. | |
| 7. Where purchased..... | Ripley Steel Boat Co. | United States Navy Yard. | United States Navy Yard. | Borden & Seileck Co. | |
| 8. From whom purchased..... | 484. | \$13,701.70. | do. | \$250. | |
| 9. Purchase price..... | \$484. | \$211.43. | \$16,293.77. | | \$1,000. |
| 10. Contract cost..... | \$484. | \$200. | \$12,000. | \$100. | \$200. |
| 11. Complete cost with outfit..... | | | | | |
| 12. Present value..... | | | | | |
| 13. Hull: | | | | | |
| (a) Material of hull..... | Steel. | Wood. | Steel. | Wood. | Wood, cypress. |
| (b) Length over all..... | 24 feet 8 inches. | 21 feet 7 inches. | 60 feet. | 20 feet. | 31 feet. |
| (c) Length on water line..... | 24 feet 8 inches. | 21 feet 2 inches. | 54 feet. | 18 feet 2 inches. | 30 feet. |
| (d) Beam over all..... | 5 feet 6 inches. | 4 feet 11 inches. | 15 feet. | 5 feet 5 inches. | 8 feet. |
| (e) Beam on water line..... | 4 feet 6 inches. | 3 feet 6 inches. | 14 feet 6 inches. | 4 feet 2 inches. | 5 feet 8 inches. |
| (f) Depth of hull forward..... | 2 feet 4 inches. | 2 feet 6 inches. | 8 feet 3 inches. | 3 feet. | 3 feet. |
| (g) Depth of hull amidships..... | 2 feet 1½ inches. | 1 foot 7 inches. | 6 feet. | 2 feet 3½ inches. | 2 feet 2 inches. |
| (h) Depth of hull aft..... | 1 foot 5½ inches. | 1 foot 5 inches. | 7 feet 6 inches. | 3 feet. | 1 foot 11 inches. |
| (i) Draft forward..... | 1 foot. | 5 inches. | 3 feet. | 10 inches. | 9 inches. |
| (j) Draft at..... | 6 inches. | 5 inches. | 4 feet 6 inches. | 1 foot 3 inches. | 5 inches. |
| (k) Draft to bottom of propeller..... | 1 foot 10 inches. | 1 foot 6 inches. | 4 feet 1 inch. | 1 foot 1 inch. | 1 foot 10 inches. |
| (l) Depth of keel from bottom of outside of planing..... | No keel. | No keel. | 3 inches. | ½ inch. | 6 inches. |
| (m) Displacement (long tons)..... | 2. | 1½. | 43.5. | 0.9. | 3. |
| (n) Speed in statute miles per hour..... | 6. | 7. | 9.6. | Approximately 6 miles. | 6. |
| 14. House: | | | | | |
| (a) Length..... | None. | None. | 36 feet. | None. | 16.5. |
| (b) Width..... | | | 7 feet. | | 6.9. |
| (c) Height above deck..... | | | 7 feet. | | 4. |
| (d) Accommodations..... | | | 6 persons. | | 15. |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916.

| Name..... | Bonne Femme. | Bon Homme. | Brunswick. | Barton 21. | Caddo. |
|---|--|--|--|---|--|
| OPERATING COST. | | | | | |
| 20 Pay roll..... | \$135.00 | \$25.84 | \$1,955.83 | ..... | ..... |
| 21 Subistence..... | 45.00 | ..... | 1,585.00 | ..... | ..... |
| 22 Fuel..... | 37.80 | 22.15 | 11,905.84 | \$6.61 | \$123.62 |
| 23 Supplies (machinery)..... | ..... | 7.59 | 389.82 | ..... | 19.31 |
| 24 Repairs: | | | | | |
| (a) Hull..... | ..... | 30.42 | 123.85 | ..... | ..... |
| (b) Machinery..... | 67.33 | 28.67 | 708.40 | ..... | 17.46 |
| 25 Additions and alterations..... | ..... | ..... | ..... | ..... | ..... |
| 26 Miscellaneous..... | 3.00 | 5.52 | 542.80 | .00 | ..... |
| 27 Total..... | \$288.83 | \$121.22 | \$6,342.44 | \$7.21 | \$170.99 |
| 28 Approximate number of miles run during year..... | 675..... | 777..... | 5,631..... | 151..... | 2,000..... |
| 29 Number of days in commission..... | 89..... | 45..... | Unknown..... | 7..... | 365..... |
| 20. Cost of fuel per gallon..... | 13 cents..... | 20 cents..... | Average cost gasoline, 20.2 cents; kerosene, 8.6 cents. | 23 to 25 cents..... | 22½ cents..... |
| | <i>Remarks.</i>
Missouri River, Kansas City to mouth; with snag boat Missouri; used for dispatch service. | <i>Remarks.</i>
Operated on the Missouri River, Kansas City to mouth; used in dispatch service. | <i>Remarks.</i>
Used as tender to U. S. pipeline dredge Creighton; 6,744 gallons gasoline and 7,323 gallons kerosene. | <i>Remarks.</i>
Launch carried on dredge Barton as lifeboat. In commission throughout the year, but seldom used. | <i>Remarks.</i>
Caddo Lake Dam to Jefferson, Tex., on Cypress Bayou, Tex. and La. |

| Name..... | Calcutta. | Carroll. | Catoma. | Carroll. | Catoma. | Carrizo. | Carrizo. |
|--|-------------------------------|--------------------------|---------------------------------|----------------------------|---|----------|----------|
| 1. District..... | New Orleans, La. | Third Mississippi River. | Montgomery, Ala. | Galveston, Tex. | Los Angeles, Cal. | | |
| 2. Where built..... | Plaquemine, La. | Reedale, Miss. | St. Joseph, Mich. | do. | Los Angeles Harbor, Cal. | | |
| 3. When built..... | 1915. | 1912. | 1903. | 1916. | 1914. | | |
| 4. Builder..... | Engineer Department. | Edward R. Kirchner. | Trussett Boat Manufacturing Co. | U. S. Engineer Department. | Fulton & Woodley. | | |
| 5. Time to build..... | 2 months. | 1 year 6 months. | 3 months. | 10 months. | 85 days. | | |
| 6. Where purchased..... | | Lake Providence, La. | St. Joseph, Mich. | | Los Angeles, Cal. | | |
| 7. When purchased..... | | Sept. 30, 1916. | 1907. | | 1914. | | |
| 8. From whom purchased..... | | Edward R. Kirchner. | Trussett Boat Manufacturing Co. | | Fulton & Woodley. | | |
| 9. Purchase price..... | | \$2,400. | \$1,205. | | \$3,150. | | |
| 10. Contract cost..... | | \$4,500. | \$1,205. | | \$3,150. | | |
| 11. Complete cost with outfit..... | | \$4,500. | \$1,205. | | \$3,150.49. | | |
| 12. Present value..... | | \$3,500. | \$700. | | \$2,700. | | |
| 13. Hull..... | Wood | Cypress and oak | Wood | Wood | Wood | | |
| (a) Material of hull..... | 37 feet 10 inches | 51 feet 5 inches. | 25 feet. | 30 feet 10 inches. | 36 feet 6 inches. | | |
| (b) Length overall..... | 33 feet 84 inches. | 45 feet. | 25 feet. | | 33 feet 9 inches. | | |
| (c) Length on water line..... | 10 feet 84 inches | 11 feet 5 inches | 7 feet 3 inches | 8 feet 10 inches | 9 feet 6 inches. | | |
| (d) Beam overall..... | 9 feet 7 inches | 10 feet. | 6 feet 3 inches. | 5 feet 3 inches. | 9 feet. | | |
| (e) Beam on water line..... | 5 feet 23 inches. | 4 feet. | 3 feet 6 inches. | 5 feet 9 inches. | 4 feet 6 inches. | | |
| (f) Depth of hull forward..... | 4 feet. | 3 feet. | 2 feet. | 5 feet 9 inches. | 4 feet 9 inches. | | |
| (g) Depth of hull amidships..... | 4 feet 13 inches | 2 feet. | 1 foot 8 inches. | 5 feet. | 2 feet. | | |
| (h) Depth of hull aft..... | 1 foot 10 inches | 1 foot 6 inches. | 8 inches. | 2 feet. | 2 feet. | | |
| (i) Draft forward..... | 3 feet 1 inch. | 3 inches. | 1 foot 2 inches. | 3 feet 4 inches. | 4 feet. | | |
| (j) Draft to bottom of keel..... | 2 feet 11 inches. | 3 inches. | 1 foot 2 inches. | 3 feet. | 4 feet. | | |
| (k) Draft of propeller..... | 5 inches. | 2 inches. | 13 inches. | 11 inches. | 5 inches. | | |
| (l) Depth of keel from bottom of keel to outside of plating..... | 5.6. | 8. | 2. | 12 tons. | 7.32. | | |
| (m) Displacement (net tons)..... | 73. | 73. | 8. | 10. | 9. | | |
| (n) Speed in statute miles per hour..... | | | | | | | |
| 14. Engines..... | | | | | | | |
| (a) Number..... | 15.85 feet | 20 feet. | 15 feet 6 inches | 16 feet. | 13 feet. | | |
| (b) Length..... | 7.9 feet | 10 feet. | 6 feet 6 inches. | 6 feet 8 inches. | 6 feet 6 inches | | |
| (c) Width..... | 2.5 feet aft, 4 feet forward. | 5 feet. | 4 feet. | 4 feet. | Pilot house, 5 feet 3 inches; engine room, 2 feet 6 inches. | | |
| (d) Height above deck..... | | | | | Toilet only. | | |
| (e) Accommodations..... | Seating capacity of 6. | 50 passengers. | Slide seats. | 2 man. | | | |

TABLE XVII.—*Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Culcasten. | Carroll. | Catoma. | Cavalla. | Cerritos. |
|---|------------------|---------------|---------------------------|----------------------|-------------------------|
| 15. Motors: | | | | | |
| (a) Number..... | 1. | 1. | 1. | 1. | 1. |
| (b) Type..... | Make and break. | 4-cycle. | 2-cylinder. | 4-cycle, heavy duty. | 4-cycle. |
| (c) When built..... | Unknown. | 1911. | 1908. | 1915. | 1914. |
| (d) Make..... | Frisco standard. | Wolverine. | Melitz & Weiss, kerosene. | Buffalo. | Imperial Gas Engine Co. |
| (e) Number of cylinders (1 engine). | 2. | 3. | 2. | 4. | 3. |
| (f) Diameter of cylinder. | 7½ inches. | 7½ inches. | 4 inches. | 7 inches. | 7½ inches. |
| (g) Stroke..... | 9 inches. | 9 inches. | 4½ inches. | 9 inches. | 9 inches. |
| (h) Revolutions per minute. | 320. | 350. | 700. | 400-450. | 300. |
| (i) Rated brake horsepower (total). | 24.3. | 36. | 7. | 45-50. | 35. |
| (j) Weight of 1 motor. | 2,685 pounds. | 3,500 pounds. | 875 pounds. | | 3,750 pounds. |
| 16. Propeller: | | | | | |
| (a) Number of blades. | 3. | 4. | 3. | 3. | 3. |
| (b) Diameter..... | 34 inches. | 24 inches. | 16 inches. | 32 inches. | 36 inches. |
| (c) Pitch..... | 30 inches. | 34 inches. | 18 inches. | 36 inches. | 34 inches. |
| (d) Diameter of shaft. | 2 inches. | 2½ inches. | 1½ inches. | 2 inches. | 2½ inches. |
| 17. Heating system: | | | | | |
| (a) Type..... | None. | None. | None. | None. | None. |
| (b) Size of heater. | do. | do. | do. | do. | do. |
| (c) Number of radiators. | do. | do. | do. | do. | do. |
| 18. Electric-light plant: | | | | | |
| (a) Make..... | do. | None. | None. | None 1. | Do. |
| (b) Type of motor. | do. | do. | do. | do. | do. |
| (c) Brake horsepower. | do. | do. | do. | do. | do. |
| (d) Revolutions per minute. | do. | do. | do. | do. | do. |
| (e) Capacity of generator in kilowatts. | do. | do. | do. | do. | do. |
| (f) Number of lights. | do. | do. | do. | do. | do. |
| (g) Average candlepower per light. | do. | do. | do. | do. | do. |
| (h) Diameter of searchlight. | do. | do. | do. | do. | do. |
| 19. Number of men in crew. | 1. | 2. | 1. | 1. | 1. |

| OPERATING COST. | | | | | |
|--|------------------------|--|---|---|---|
| 20. Pay roll..... | \$940.00 | | | | |
| 21. Subsistence..... | | \$405.00 | | | |
| 22. Fuel..... | 419.07 | 100.00 | | | |
| 23. Supplies (machinery)..... | | 202.00 | | | |
| 24. Repairs: | | 15.00 | | | |
| (a) Hull..... | | | | | |
| (b) Machinery..... | | 30.00 | | | |
| 25. Additions and alterations..... | 56.64 | 62.84 | | | |
| 26. Miscellaneous..... | 36.71 | | | | |
| 27. Total..... | \$1,052.42 | \$823.34 | | | |
| 28. Approximate number of miles run during year..... | 6,014..... | 1,300..... | \$507.06 | \$1,159.03 | |
| 29. Number of days in commission..... | 356..... | 100..... | 93..... | | |
| 30. Cost of fuel per gallon..... | \$0.106 + average..... | 15 1/2 cents..... | \$0.008..... | | |
| | | Remarks. | Remarks. | Remarks. | Remarks. |
| | | Launch acts as tender to dredge Grossetete and operated in Bayous Grossetete, Plaquemine, Plaquemine-Morgan City waterway, and Bayou Teche.
The launch was actually operated in the following manner: Towing 944 miles in 321 hours 44 minutes: light 3,599 miles in 493 hours 45 minutes.
In question No. 28 the "towing miles" have been reduced to "light miles." | Tender for survey party. Mississippi River supply tender at Ashbrook Neck revetment and dike. | This plant was used as a tender to the survey boat and was operated on the Alabama River, Ala., between Montgomery, Ala., and Mile No. 100, below Montgomery. | Batteries charged ashore. Placed in commission in August. |
| | | | | | Out of commission entire year. |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name | Charlton. | Chica. | Chicago. | Chico. | Chicot. |
|---|----------------------------|-------------------------------|------------------------------|--------------------------|-----------------------------|
| 1. District. | Kansas City, Mo. | Jacksonville, Fla. | Chicago, Ill. | First, Cincinnati, Ohio. | Third Mississippi River. |
| 2. Where built. | Gasconade, Mo. | Portland, Me. | Milwaukee, Wis. | Salem, Ohio. | Grafton, Ill. |
| 3. When built. | 1914 | 1904 | 1916 | W. H. Mullins Co. | Ripley Steel Boat Co. |
| 4. Builder. | U. S. Engineer Department. | The Portland Co. | St. Louis Yacht and Boat Co. | 9 months. | 30 days. |
| 5. Time to build. | One month. | Not known. | 9 months. | Portland, Ohio. | |
| 6. Where purchased. | | Portland, Me. | | C. S. Wheeler. | |
| 7. When purchased. | | 1904 | | \$541.50 | |
| 8. From whom purchased. | | The Portland Co. | | | |
| 9. Purchase price. | | Included in contract price of | \$19,990. | | Hull, \$387; machinery, |
| 10. Contract cost. | \$386.62. | the dredge Key West. | (Outfit not yet purchased.) | | \$1,771.50. |
| 11. Complete cost with outfit. | \$399.78. | \$200. | \$20,000. | \$541.50. | \$1,871.50. |
| 12. Present value. | \$225. | | | \$200. | \$1,400. |
| 13. Hull: | | | | | |
| (a) Material of hull. | Wood. | Wood. | Wood. | Steel. | Galvanized steel. |
| (b) Length over all. | 24 feet. | 19 feet 6 inches. | 75 feet 4½ inches. | 20 feet. | 35 feet 5 inches. |
| (c) Length on water line. | 22 feet. | 18 feet 2 inches. | 72 feet. | 19 feet 6 inches. | 34 feet 6 inches. |
| (d) Beam over all. | 5 feet. | 5 feet 5 inches. | 15 feet 6 inches. | 5 feet. | 6 feet 6 inches. |
| (e) Beam on water line. | 4 feet 6 inches. | 4 feet 7 inches. | 15 feet. | 4 feet 6 inches. | 5 feet 10 inches. |
| (f) Depth of hull forward. | 2 feet 1½ inches. | 3 feet 2 inches. | 11 feet 9 inches. | 2 feet 2 inches. | 3 feet 1 inch. |
| (g) Depth of hull amidship. | 1 foot 10½ inches. | 2 feet 7 inches. | 9 feet 3 inches. | 1 foot 3 inches. | 3 feet. |
| (h) Depth of hull aft. | 1 foot 10 inches. | 3 feet 2 inches. | 9 feet 2 inches. | 1 foot 3 inches. | 2 feet 10 inches. |
| (i) Draft forward. | 4 inches. | 10 inches. | 4 feet 7 inches. | 4 inches. | 1 foot 2 inches. |
| (j) Draft at. | 4 inches. | 1 foot 2 inches. | 5 feet 4 inches. | 1 foot 2 inches. | 2 feet 6 inches. |
| (k) Draft to bottom of propeller. | 1 foot 5 inches. | 1 foot 5 inches. | 4 feet 11 inches. | 1 foot 8 inches. | 2 feet 6 inches. |
| (l) Depth of keel from bottom of outside of planking. | No keel. | 1 inch. | 8 inches. | | None. |
| (m) Displacement (long tons). | 1. | 0.35. | 83. | 0.6. | 4.2. |
| (n) Speed in statute miles per hour. | 8½. | 8. | 10.55. | 10. | 12. |
| 14. House: | | | | | |
| (a) Length. | | | 20 feet. | | 13 feet 2 inches (cockpit). |
| (b) Width. | | | 10 feet 3 inches (average). | | 5 feet 6 inches. |
| (c) Height above deck. | | | 2 feet 6 inches. | | |
| (d) Accommodations. | | | 5. | | 3 passengers. |

[illegible]

TABLE XVII.—*Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.*

| Name | Chertlon. | Chica. | Chicago. | Chico. | Chico. |
|---|----------------------------|-------------------------------|---------------------------------|------------------------------|-----------------------------|
| 1. District..... | Kansas City, Mo..... | Jacksonville, Fla..... | Chicago, Ill..... | First, Cincinnati, Ohio..... | Third Mississippi River. |
| 2. Where built..... | Gasconade, Mo..... | Portland, Me..... | Milwaukee, Wis..... | Salem, Ohio..... | Grafton, Ill. |
| 3. When built..... | 1914..... | 1904..... | 1916..... | 1913..... | 1913..... |
| 4. Builder..... | U. S. Engineer Department. | The Portland Co..... | St. Louis Yacht and Boat Co. | W. H. Mullins Co..... | Ripley Steel Boat Co. |
| 5. Time to build..... | One month..... | Not known..... | 9 months..... | 30 days..... | 30 days..... |
| 6. Where purchased..... | One month..... | Portland, Me..... | 1913..... | Portsmouth, Ohio..... | |
| 7. When purchased..... | 1904..... | The Portland Co..... | | C. S. Wheeler..... | |
| 8. From whom purchased..... | | | | \$541.50..... | |
| 9. Purchase price..... | | Included in contract price of | \$19,900..... | \$541.50..... | Hull, \$387; machinery, |
| 10. Contract cost..... | \$288.52..... | the dredge Key West. | Outfit not yet purchased..... | | \$1,121.50. |
| 11. Complete cost with outfit..... | \$290.75..... | | | | \$1,877.95. |
| 12. Present value..... | \$225..... | \$200..... | \$20,000..... | \$200..... | \$1,400. |
| 13. Hull: | | Wood..... | Wood..... | Steel..... | Galvanized steel. |
| (a) Material of hull..... | Wood..... | 19 feet 6 inches..... | 75 feet 4½ inches..... | 20 feet..... | 35 feet 5 inches. |
| (b) Length over all..... | 24 feet..... | 18 feet 2 inches..... | 72 feet..... | 19 feet 6 inches..... | 34 feet 6 inches. |
| (c) Length on water line..... | 22 feet..... | | | | |
| (d) Beam over all..... | 5 feet..... | 5 feet 5 inches..... | 15 feet 6 inches..... | 5 feet..... | 5 feet 6 inches. |
| (e) Beam on water line..... | 4 feet 6 inches..... | 4 feet 7 inches..... | 15 feet..... | 4 feet 6 inches..... | 5 feet 10 inches. |
| (f) Depth of hull forward..... | 2 feet 1½ inches..... | 3 feet 2 inches..... | 11 feet 9 inches..... | 2 feet 2 inches..... | 3 feet 1 inch. |
| (g) Depth of hull amidship..... | 1 foot 10½ inches..... | 2 feet 7 inches..... | 9 feet 3 inches..... | 1 foot 3 inches..... | 3 feet. |
| (h) Depth of hull aft..... | 1 foot 10 inches..... | 3 feet 2 inches..... | 9 feet 3 inches..... | 1 foot 3 inches..... | 2 feet 10 inches. |
| (i) Draft forward..... | 4 inches..... | 10 inches..... | 4 feet 7 inches..... | 4 inches..... | 1 foot 2 inches. |
| (j) Draft aft..... | 4 inches..... | 1 foot 3 inches..... | 5 feet 4 inches..... | 5 feet 4 inches..... | 2 feet 6 inches. |
| (k) Draft to bottom of propeller..... | 1 foot 5 inches..... | 1 foot 5 inches..... | 4 feet 11 inches..... | 1 foot 5 inches..... | 2 feet 6 inches. |
| (l) Depth of keel from bottom of outside of planking..... | No keel..... | 1 inch..... | 8 inches..... | | None. |
| (m) Displacement (long tons)..... | 1..... | 0.35..... | 53..... | 0.6..... | 4.2. |
| (n) Speed in statute miles per hour..... | 8½..... | 8..... | 10.55..... | 10..... | 12. |
| 14. House: | | | | | |
| (a) Length..... | | | 20 feet..... | | 13 feet 2 inches (cockpit). |
| (b) Width..... | | | 10 feet 3 inches (average)..... | | 5 feet 6 inches. |
| (c) Height above deck..... | | | 2 feet 6 inches..... | | 5 feet 6 inches. |
| (d) Accommodations..... | | | 8..... | | 8 passengers. |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Charlton. | Chica. | Chicago. | Chico. | Chico. |
|--|---|--|--|--------------------------------------|--|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | \$205.10 | | | | |
| 21. Subsistence..... | 81.51 | | \$571.64 | | \$720.00 |
| 22. Fuel..... | 136.15 | (1) | 112.45 | | 150.00 |
| 23. Supplies (machinery)..... | 7.35 | (1) | | \$27.69 | 430.00 |
| 24. Repairs: | | 11.75 | | .20 | 140.00 |
| (g) Hull..... | 15.33 | | | | 25.00 |
| (h) Machinery..... | 25.34 | | | | 192.00 |
| 25. Additions and alterations..... | 172.00 | | 44.31 | 3.47 | |
| 26. Miscellaneous..... | 30.05 | 7.50 | 160.16 | | 15.00 |
| 27. Total..... | \$678.13 | \$175.53 | \$848.56 | \$31.36 | \$1,622.05 |
| 28. Approximate number of miles run during year..... | 2,149 | 213 | 225 | 320 | 7,500 |
| 29. Number of days in commission..... | 131 | 300 approximate | 22 | 200 | 300 |
| 30. Cost of fuel per gallon..... | 16.7 cents | 181 cents | 151 cents | Average, 231 cents | 15.5 cents |
| | Remarks. | Remarks. | Remarks. | Remarks. | Remarks. |
| | Missouri River (Kansas City to mouth) dispatch service. | 1 Part of life-saving equipment Key West operated during year as dispatch boat by members of the crew of the dredge.
2 The hull was rebuilt and the old motor installed at a cost of \$140. | Placed in commission Nov. 21, 1916. Used for inspection of river and harbor works at Chicago and Calumet Rivers and Harbors, Indiana and Michigan City Harbors, Indiana. | Operated at Dam. No. 31, Ohio River. | Used by superintendent of brush outfits as tender and for inspection work.
1 Lubricating oil. |

| Name..... | Chippewa. | Cincinnati. | Cincinnati. | Clyde. |
|---|--------------------------|--------------------------|----------------------------|----------------------------|
| 1. District..... | Montgomery, Ala. | First, Cincinnati, Ohio. | Chattanooga, Tenn. | First, San Francisco, Cal. |
| 2. Where built..... | Apalachicola, Fla. | St. Paul, Minn. | Riverton, Ala. | Fairhaven, Cal. |
| 3. When built..... | 1900. | 1913. | 1912. | 1904. |
| 4. Builder..... | Charles Doyle | Jos. Dingle Boat Works. | U. S. Engineer Department. | W. F. McDonald. |
| 5. Time to build..... | 3 months. | 9 months. | 2 months. | 3 months. |
| 6. Where purchased..... | Apalachicola, Fla. | St. Paul. | Cincinnati, Ohio. | Eureka, Cal. |
| 7. When purchased..... | Mar. 24, 1916. | 1913. | 1914. | 1911. |
| 8. From whom purchased..... | Apalachicola State Bank. | Jos. Dingle Boat Works. | Clen P'errine. | Alex. McLean. |
| 9. Purchase price..... | \$500. | \$1,724. | \$290. | \$500. |
| 10. Contract cost..... | | \$1,724. | \$290. | Not known. |
| 11. Complete cost with outfit..... | | \$983.64. | \$400. | \$1,250. |
| 12. Present value..... | | | | \$4,000. |
| 13. Hull: | | | | |
| (a) Material of hull..... | White cypress. | Wood. | Wood. | Wood. |
| (b) Length over all..... | 42 feet. | 35 feet. | 25 feet 9 inches. | 42 feet. |
| (c) Length on water line..... | 37 feet. | 34 feet 9 inches. | 25 feet. | 32 feet. |
| (d) Beam over all..... | 8 feet 6 inches. | 5 feet 8 inches. | 6 feet. | 9 feet 8 inches. |
| (e) Beam on water line..... | 8 feet. | 3 feet 10 inches. | 4 feet 10 inches. | 9 feet 3 inches. |
| (f) Depth of hull forward..... | 7 feet. | 3 feet 4 inches. | 3 feet. | 4 feet. |
| (g) Depth of hull amidships..... | 4 feet 4 inches. | 2 feet. | 2 feet 6 inches. | 2 feet 7 1/2 inches. |
| (h) Depth of hull aft..... | 6 feet. | 7 1/2 inches. | 1 foot 8 inches. | 3 feet 1 inch. |
| (i) Draft forward..... | 2 feet. | 11 inches. | 4 inches. | 2 feet. |
| (j) Draft aft..... | 3 feet. | 3 inches. | 5 inches. | 2 feet 10 inches. |
| (k) Draft to bottom of propeller..... | 2 feet 4 inches. | 2 feet 1 inch. | 2 feet. | 2 feet 6 inches. |
| (l) Depth of keel from bottom of outside of planking..... | 5 inches. | 1 1/2 inches. | 6 inches. | 4 inches. |
| (m) Displacement (long tons)..... | 7. | 2. | 9. | 9 gross, 6 net. |
| (n) Speed in statute miles per hour..... | 8. | 16. | 8. | 9. |
| 14. House: | | | | |
| (a) Length..... | 29 feet 6 inches. | None (Kanyon auto top). | | 20 feet. |
| (b) Width..... | 7 feet 6 inches. | | | 6 feet 9 1/2 inches. |
| (c) Height above deck..... | 3 feet. | | | 6 feet 11 inches. |
| (d) Accommodations..... | Seats 25; sleeps 4. | 4 chairs, 2 seats. | | Seating 8 people. |

TABLE XVII.—*Report of operations of gasoline launches (serew) for the calendar year ending Dec. 31, 1916—Continued.*

| Name. | Chippewa. | Clermont. | Clyde. | Clyde. |
|---|-----------------------|----------------------------|----------------------|---|
| 15. Motors: | | | | |
| (a) Number. | 1 (0-36-T-1407). | 1. | 1. | 1. |
| (b) Type. | 2-cycle. | 4-cycle. | Marine. | 3-cylinder, 4-cycle. |
| (c) When built. | 1912. | Kermath Manufacturing Co. | 1912. | 1911. |
| (d) Make. | Gray Motor Co. | Auto Engine Works, Capitol | Vulcan Engine Works. | Union Gas Engine Co. |
| (e) Number of cylinders (one engine). | 3. | 4. | 4. | 3. |
| (f) Diameter of cylinder. | 5½ inches. | 3½ inches. | 5½ inches. | 7½ inches. |
| (g) Stroke. | 5 inches. | 4 inches. | 7 inches. | 8 inches. |
| (h) Revolutions per minute. | 800. | Up to 1,000. | 465. | 360. |
| (i) Rated brake horsepower (total). | 36. | 40. | 20. | 20. |
| (j) Weight of one motor. | 765 pounds. | 750 pounds. | 1,200 pounds. | 4,100 pounds. |
| 16. Propeller: | | | | |
| (a) Number of blades. | 3. | 3. | 3. | 3. |
| (b) Diameter. | 22 inches. | 16 inches. | 24 inches. | 34 inches. |
| (c) Pitch. | 30 inches. | do. | 33 inches. | 34 inches. |
| (d) Diameter of shaft. | 1½ inches. | 1½ inches. | 1½ inches. | 2 inches. |
| 17. Heating system: | | | | |
| (a) Type. | None. | None. | None. | None. |
| (b) Size of heater. | None. | None. | None. | None. |
| (c) Number of radiators. | None. | None. | None. | None. |
| 18. Electric-light plant: | | | | |
| (a) Make. | Hercules Electric Co. | None. | None. | Dayton Electrical Manufacturing Co. |
| (b) Type of motor. | Wizard magneto. | None. | None. | Belt to main engine, fly wheel; storage batteries for use when launch is not running. |
| (c) Brake horsepower. | 1,300. | None. | None. | 30, more or less. |
| (d) Revolutions per minute. | 48. | None. | None. | 360. |
| (e) Capacity of generator in kilowatts. | 48. | None. | None. | 1. |
| (f) Number of lights. | 7. | None. | None. | 10. |
| (g) Average candle-power per light. | 5. | None. | None. | 17. |

| (A) Diameter of searchlight. | | 6 inches. | | 12 inches. | | 18 inches. | | 24 inches. | | Remarks. | |
|--|--|------------|----------|--|----------|-------------------------------------|----------|-----------------------|------------|--|------------|
| 19. Number of men in crew | | 1. | 2. | 1. | 2. | 1. | 2. | 1. | 2. | 1. | 2. |
| OPERATING COST. | | | | | | | | | | | |
| 20. Pay roll..... | | \$185.85 | \$120.00 | | | | | | | | |
| 21. Subsistence..... | | 8.39 | | | | | | | | | |
| 22. Fuel..... | | 284.65 | 64.38 | | | | | | | | |
| 23. Supplies (machinery)... | | 64.16 | 3.00 | | | | | | | | |
| 24. Repairs..... | | 30.51 | 66.00 | | | | | | | | |
| (a) Hull..... | | 208.88 | 33.67 | | | | | | | | |
| (b) Machinery..... | | 49.00 | | | | | | | | | |
| 25. Additions and alterations..... | | | | | | | | | | | |
| 26. Miscellaneous..... | | 193.97 | | | | | | | | | |
| Total..... | | \$1,032.31 | | | | | | | | | |
| 27. Approximate number of miles run during year..... | | 500 | | 1,351 | \$399.98 | 2,600 | \$807.72 | 2,350 | \$1,704.08 | 11,020 | \$2,218.55 |
| 28. Number of days in commission..... | | 30 | | 161 | | 180 | | 226 | | 320 | |
| 29. Cost of fuel per gallon..... | | \$0.245 | | 15 to 20 cents | | Average 22 cents | | 22 cents | | Distillate, \$0.088; gasoline, \$0.17; gasoline, \$0.175.1 | |
| Remarks. | | | | | | | | | | | |
| This item of plant was purchased as the launch Juanita from the Apalachicola State Bank, Mar. 29, 1916 for \$300. She was operated in Apalachicola Bay, Fla. | | | | Mississippi River, Rock Island Division, LeClaire Canal on inspection service. | | Operated at Dam No. 35, Ohio River. | | Colbert Shoals Canal. | | General tender for work rebuilding jetties at Humboldt Harbor, Cal. Towing, freight, and dispatch boat. Survey of entrance channels annually. Fuel for first 6 months. | |

TABLE XVII.—Report of operations of gasoline launches (seven) for the calendar year ending Dec. 31, 1916.—Continued.

| Name | Cockspur. | Colonel. | Commodore. | Coc. | Coposo. |
|---|---------------------|--------------------------------------|----------------------------|----------------------------|----------------------------|
| 1. District | Savannah, Ga. | Galveston, Tex. | Galveston, Tex. | Montgomery, Ala. | Galveston, Tex. |
| 2. Where built | Jacksonville, Fla. | New York, N. Y. | do. | Fort Pickens, Fla. | Do. |
| 3. When built | 1914 | 1906 | 1910 | 1911 | 1916 |
| 4. Builder | Merrill-Stevens Co. | Chas. L. Seabury & Co. | U. S. Engineer Department. | U. S. Engineer Department. | U. S. Engineer Department. |
| 5. Time to build | 2 months | 4 months | 3 months | 3 weeks | 3 months |
| 6. Where purchased | Jacksonville, Fla. | Jacksonville, Fla. | Jacksonville, Fla. | Built by hired labor. | |
| 7. When purchased | 1914 | October 9, 1912 | | | |
| 8. From whom purchased | Merrill-Stevens Co. | J. W. Merrill | | | |
| 9. Purchase price | \$399 | \$6,500 | | | |
| 10. Contract cost | \$399 | \$14,000 | \$984.06 | | \$1,425.89. |
| 11. Complete cost with outfit. | \$399 | | | \$387 | |
| 12. Present value | \$250 | \$6,000 | \$600 | \$275 | \$1,400. |
| 13. Hull: | | | | | |
| (a) Material of hull | Wood. | Wood. | Wood. | Wood. | Wood. |
| (b) Length over all | 20 feet. | 66 feet 8 inches. | 23 feet 4 inches. | 21 feet. | 21 feet. |
| (c) Length on water line. | 19 feet. | 62 feet 6 inches. | 21 feet. | 20 feet 6 inches. | 23 feet 6 inches. |
| (d) Beam over all | 6 feet. | 12 feet 6 inches. | 6 feet. | 4 feet 7 inches. | 7 feet. |
| (e) Beam on water line. | 4 feet 9 inches. | 12 feet. | 5 feet 5 inches. | 4 feet. | 6 feet. |
| (f) Depth of hull forward. | 3 feet 8 inches. | 6 feet. | 3 feet 2 inches. | 2 feet 3 inches. | 4 feet 5 inches. |
| (g) Depth of hull amidships. | 2 feet 9 inches. | 5 feet 6 inches. | 2 feet 10 inches. | 2 feet. | 4 feet 4 inches. |
| (h) Depth of hull aft. | 3 feet 3 inches. | 4 feet 6 inches. | 3 feet 2 inches. | 1 foot 8 inches. | 2 feet 8 inches. |
| (i) Draft forward | 8½ inches. | 2 feet 4 inches. | 10 inches. | 10 inches. | 2 feet. |
| (j) Draft aft. | 1 foot 6 inches. | 3 feet 4 inches. | 1 foot 7 inches. | 1 foot 8 inches. | 2 feet 2 inches. |
| (k) Draft to bottom of propeller. | 1 foot 6 inches. | 2 feet 10½ inches. | 1 foot 5 inches. | 1 foot 6 inches. | 2 feet 10 inches. |
| (l) Depth of keel from bottom of outside of planking. | 3 inches. | 3 inches. | 6 inches. | 1½ inches. | 1 foot 8 inches. |
| (m) Displacement (long tons). | 1.4. | 31. | 1. | 1½. | 2. |
| (n) Speed in statute miles per hour. | 8. | 10. | 8. | 6. | 8½. |
| 14. House: | | | | | |
| (a) Length | None. | 47 feet. | | None. | 8 feet. |
| (b) Width | | 11 feet 6 inches. | | | 4 feet 6 inches. |
| (c) Height above deck. | | 4 feet 2 inches and 2 feet 4 inches. | | | 1 foot 6 inches. |

| (d) Accommodations. | | 1 observation, 2 state, 1 m-
loon; lavatory, galley, and
engine room. | None. | None. |
|---|---------------------------------|---|----------------|-----------------------|
| 15. Motors: | | | | |
| (a) Number..... | 1..... | 4-cycle. | 1..... | 1..... |
| (b) Type..... | 2..... | 4-cycle. | 1..... | 4-cycle, medium-duty. |
| (c) When built..... | Unknown. | 1913. | 1913. | 1913. |
| (d) Make..... | Farris Machine & Foundry
Co. | Lamb Dost & Engine Co. | Gray Motor Co. | Lamb Engine Co. |
| (e) Number of cylin-
ders (one en-
gine)..... | 2..... | 4..... | 1..... | 4..... |
| (f) Diameter of cyl-
inder..... | 3½ inches. | 6½ inches. | 4½ inches. | 5½ inches. |
| (g) Stroke..... | 3½ inches. | 7 inches. | 6½ inches. | 6 inches. |
| (h) Revolutions per
minute..... | 600. | 500. | 400. | 500. |
| (i) Rated brake
horsepower
(total)..... | 8..... | 80. | 10-12. | 24. |
| (j) Weight of one
motor..... | Unknown. | 2,200 pounds. | 1,000 pounds. | 1,180 pounds. |
| 16. Propeller: | | | | |
| (a) Number of blades..... | 2..... | 3..... | 2..... | 3..... |
| (b) Diameter..... | 18 inches. | 30 inches. | 22 inches. | 18 inches. |
| (c) Pitch..... | do. | 38 inches. | 30 inches. | 30 inches. |
| (d) Diameter of shaft..... | 1 inch. | 1½ inches. | 1½ inches. | 1½ inches. |
| 17. Heating system: | | | | |
| (a) Type..... | None. | None. | None. | None. |
| (b) Size of heater..... | | | | |
| (c) Number of radia-
tors..... | | | | |
| 18. Electric-light plant: | | | | |
| (a) Make..... | None. | 8mille. | None. | None. |
| (b) Type of motor..... | | 4-cycle. | | |
| (c) Brake horsepower..... | | 700. | | |
| (d) Revolutions per
minute..... | | 0.51. | | |
| (e) Capacity of gen-
erator in kilo-
watts..... | | | | |
| (f) Number of lights..... | | 31. | | |
| (g) Average candle-
power per light..... | | 16. | | |
| (h) Diameter of
searchlight..... | | 10 inches. | | |
| 19. Number of men in crew. | None 1. | 5. | 1. | 1. |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name | Cockspur. | Colonel. | Commodore. | Coot. | Copano. |
|--|------------------|-----------------------------|---|--|------------|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | | \$3,427.13 | \$842.50 | | \$875.00 |
| 21. Subsistence..... | | 2,786.18 | | | 140.65 |
| 22. Fuel..... | | 1,468.40 | 138.66 | \$21.26 | 539.08 |
| 23. Supplies (machinery)..... | | 1,309.61 | 24.39 | 3.81 | 49.66 |
| 24. Repairs: | | | | | |
| (a) Hull..... | | 2,830.22 | | | |
| (b) Machinery..... | | 2,048.85 | | 5.04 | 49.86 |
| 25. Additions and alterations..... | | 464.30 | | | 42.06 |
| 26. Miscellaneous..... | | 378.38 | | | 4.50 |
| 27. Total..... | | \$13,213.07 | \$1,005.55 | 567. | \$1,800.80 |
| 28. Approximate number of miles run during year..... | | | | 189. | |
| 29. Number of days in commission..... | | | | \$0.225. | |
| 30. Cost of fuel per gallon..... | | | | | |
| | Remarks. | Remarks. | Remarks. | Remarks. | Remarks. |
| Used as tender to U. S. dredge Savannah; cost of operating included in cost of operation of dredge Savannah. Operated by crew of dredge. | Inspection boat. | Tender to dredge Galveston. | This plant was operated as a tender for U. S. dredge Blackwater, carrying mail, supplies, etc., in the narrows in Santa Rosa Sound, Blackwater River, Apalachicola Bay, and channel from Apalachicola River to St. Andrews Bay, Fla. It was operated when necessary by a member of the crew of the Blackwater detailed for the purpose. | Tender to dredge San Jacinto; placed in commission in April. | |

| Name..... | Capt. | Comd. | Codina. | Curve. | Custodian. |
|---|-----------------------|----------------------------|-------------------|-------------------|--|
| 1. District..... | First, Portland, Ore. | Jacksonville, Fla. | Savannah, Ga. | Duluth, Minn. | Detroit, Mich. |
| 2. Where built..... | Portland, Ore. | Belast, Me. | Baltimore, Md. | St. Joseph, Mich. | St. Clair, Fla., Mich. |
| 3. When built..... | 1911 | 1904 | 1903 | Truscott Boat Co. | 1915 |
| 4. Builder..... | O. P. Graham | Geo. A. Gilchrist | Unknown | | A. E. Stokoy (hull and placing engine) |
| 5. Time to build..... | 2 months | Not known | do | | About 3 months |
| 6. Where purchased..... | Portland, Ore. | | Baltimore, Md. | St. Joseph, Mich. | St. Clair Flats Canal, Mich. |
| 7. When purchased..... | 1911 | | 1903 | 1897 | 1915 |
| 8. From whom purchased..... | O. P. Graham | | Unknown | Truscott Boat Co. | Hull, A. E. Stokoy; engine, Strelinger Marine Engine Co. |
| 9. Purchase price..... | \$1,450. | | \$350. | \$800. | \$456.06.1 |
| 10. Contract cost..... | | \$100, estimated | Unknown | | |
| 11. Complete cost with outfit..... | \$1,450. | Included in contract cost. | \$400. | | \$456.06.1 |
| 12. Present value..... | \$860. | \$100. | \$200. | \$300. | \$400. |
| 13. Hull: | | | | | |
| (a) Material of hull..... | Wood, cedar. | Wood. | Wood. | Wood. | Wood. |
| (b) Length over all..... | 28 feet. | 18 feet. | 28 feet. | 22 feet 6 inches. | 23 feet 6 inches. |
| (c) Length on water line..... | 27 feet 6 inches. | 17 feet 6 inches. | 27 feet 6 inches. | 20 feet 6 inches. | |
| (d) Beam over all..... | 5 feet 6 inches. | 4 feet 10 inches. | 6 feet 6 inches. | 6 feet 5 inches. | 7 feet 3 inches. |
| (e) Beam on water line..... | 5 feet 6 inches. | 4 feet 2 inches. | 6 feet 6 inches. | 6 feet 3 inches. | |
| (f) Depth of hull forward..... | 3 feet. | 3 feet. | 3 feet. | 3 feet. | 3 feet 6 inches. |
| (g) Depth of hull amidships..... | 2 feet 6 inches. | 2 feet 4 inches. | 2 feet 6 inches. | 2 feet 7 inches. | 2 feet 4 inches. |
| (h) Depth of hull aft..... | 2 feet 3 inches. | 2 feet 9 inches. | 2 feet 3 inches. | 2 feet 9 inches. | 3 feet 4 inches. |
| (i) Draft forward..... | 1 foot 1 inch. | 8 inches. | 1 foot 1 inch. | 1 foot. | 8 inches. |
| (j) Draft all..... | 1 foot 6 inches. | 1 foot 6 inches. | 1 foot 6 inches. | 1 foot 6 inches. | 1 foot 6 inches. |
| (k) Draft to bottom of propeller..... | 1 foot 4 inches. | 1 foot 5 inches. | 1 foot 4 inches. | 2 feet. | 1 foot 4 inches. |
| (l) Depth of keel from bottom of outside of planking..... | 9 inches. | 4 inch. | 3 inches. | 3 inches. | 3 inches. |
| (m) Displacement (long tons)..... | 2. | 0.45, estimated. | 2. | 2. | |
| (n) Speed in statute miles per hour..... | 12. | 6. | 12. | 7½. | 6. |
| 14. House: | | | | | |
| (a) Length..... | None. | None. | None. | None. | |
| (b) Width..... | | | | | |
| (c) Height above deck..... | | | | | |
| (d) Accommodations..... | | | | | |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name | Cockspur. | Colonel. | Commodore. | Cool. | Copano. |
|--|--|-------------------------------------|--|--|---|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | | \$3,427.13 | \$842.50 | | \$675.00 |
| 21. Subsistence..... | | 2,796.18 | | | 140.65 |
| 22. Fuel..... | | 1,468.40 | 138.66 | \$21.26 | 539.08 |
| 23. Supplies (machinery)..... | | 1,309.61 | 24.89 | 3.81 | 49.66 |
| 24. Repairs: | | | | | |
| (a) Hull..... | | 2,830.22 | | | |
| (b) Machinery..... | | 2,048.85 | | 5.04 | 49.86 |
| 25. Additions and alterations..... | | 464.30 | | | 42.06 |
| 26. Miscellaneous..... | | 378.38 | | | 4.50 |
| 27. Total..... | | \$13,213.07 | \$1,005.55 | \$30.11 | \$1,800.80 |
| 28. Approximate number of miles run during year..... | | | | 567..... | |
| 29. Number of days in commission..... | | | | 189..... | |
| 30. Cost of fuel per gallon..... | | | | \$0.225..... | |
| | <i>Remarks.</i>
Used as tender to U. S. dredge Savannah; cost of operating included in cost of operation of dredge Savannah.
Operated by crew of dredge. | <i>Remarks.</i>
Inspection boat. | <i>Remarks.</i>
Tender to dredge Galveston. | <i>Remarks.</i>
This plant was operated as a tender for U. S. dredge Blackwater, carrying mail, supplies, etc., in the narrows in Santa Rosa Sound, Blackwater River, Apalachicola Bay, and channel from Apalachicola River to St. Andrews Bay, Fla. It was operated when necessary by a member of the crew of the Blackwater detailed for the purpose. | <i>Remarks.</i>
Tender to dredge San Jacinto; placed in commission in April. |

| Name..... | Coyote. | Corral. | Casina. | Curra. | Custodian. |
|---|---------------------------|--------------------------------|-----------------------|-----------------------|--|
| 1. District..... | First, Portland, Ore..... | Jacksonville, Fla..... | Savannah, Ga..... | Duluth, Minn..... | Detroit, Mich. |
| 2. Where built..... | Portland, Ore..... | Bellair, Me..... | Baltimore, Md..... | St. Joseph, Mich..... | St. Clair Flats, Mich. |
| 3. When built..... | 1904..... | 1904..... | 1903..... | Truscott Boat Co..... | 1918..... |
| 4. Builder..... | O. P. Graham..... | Geo. A. Gilechrist..... | Unknown..... | Truscott Boat Co..... | A. E. Stokoy (hull and plating engine) |
| 5. Time to build..... | 2 months..... | Not known..... | do..... | St. Joseph, Mich..... | About 3 months |
| 6. Where purchased..... | Portland, Ore..... | Portland, Ore..... | Baltimore, Md..... | 1903..... | St. Clair Flats Canal, Mich. |
| 7. When purchased..... | 1904..... | 1904..... | Unknown..... | Truscott Boat Co..... | 1918..... |
| 8. From whom purchased..... | O. P. Graham..... | O. P. Graham..... | Unknown..... | Truscott Boat Co..... | Hull, A. E. Stokoy; engine, Strelinger Marine Engine Co. |
| 9. Purchase price..... | \$1,450..... | \$100, estimated..... | \$350..... | \$800..... | \$436.05.1 |
| 10. Contract cost..... | \$1,450..... | Included in contract cost..... | Unknown..... | | \$436.05.1 |
| 11. Complete cost with outfit..... | \$950..... | \$100..... | \$200..... | \$300..... | \$400..... |
| 12. Present value..... | | Wood..... | Wood..... | Wood..... | Wood. |
| 13. Hull: | | | | | |
| (a) Material of hull..... | 28 feet..... | 17 feet 6 inches..... | 27 feet 6 inches..... | 22 feet 6 inches..... | 23 feet 6 inches. |
| (b) Length over all..... | 27 feet 6 inches..... | 4 feet 10 inches..... | 6 feet 6 inches..... | 5 feet 5 inches..... | 7 feet 3 inches. |
| (c) Length on water line..... | 5 feet 6 inches..... | 4 feet 2 inches..... | 6 feet 6 inches..... | 6 feet 3 inches..... | 3 feet 6 inches. |
| (d) Beam over all..... | 5 feet 6 inches..... | 3 feet..... | 3 feet..... | 3 feet..... | 2 feet 4 inches. |
| (e) Beam on water line..... | 3 feet..... | 2 feet 4 inches..... | 2 feet 6 inches..... | 2 feet 7 inches..... | 3 feet 4 inches. |
| (f) Depth of hull forward..... | 2 feet 6 inches..... | 2 feet 9 inches..... | 2 feet 3 inches..... | 2 feet 9 inches..... | 8 inches. |
| (g) Depth of hull amidships..... | 2 feet 3 inches..... | 8 inches..... | 1 foot 1 inch..... | 1 foot..... | 1 foot 6 inches. |
| (h) Depth of hull aft..... | 1 foot 1 inch..... | 1 foot 6 inches..... | 1 foot 6 inches..... | 2 feet..... | 1 foot 4 inches. |
| (i) Draft forward..... | 1 foot 6 inches..... | 1 foot 5 inches..... | 3 inches..... | 3 inches..... | 3 inches. |
| (j) Draft at..... | 1 foot 4 inches..... | 4 inch..... | | | |
| (k) Draft to bottom of propeller..... | 9 inches..... | | | | |
| (l) Depth of keel from bottom of outside of planking..... | | | | | |
| (m) Displacement (long tons)..... | 2..... | 0.45, estimated..... | 2..... | 2..... | |
| (n) Speed in statute miles per hour..... | 12..... | 6..... | 12..... | 7½..... | 6..... |
| 14. House: | | | | | |
| (a) Length..... | None..... | None..... | None..... | None..... | |
| (b) Width..... | | | | | |
| (c) Height above deck..... | | | | | |
| (d) Accommodations..... | | | | | |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Coyote. | Corrd. | Costine. | Curve. | Custodian. |
|---|-----------------------|----------------------------|---------------------------|---------------------------------|-------------------------------|
| 15. Motors: | | | | | |
| (a) Number..... | 1. | 1. | 1. | 1. | 1. |
| (b) Type..... | 4-cycle, medium-duty. | 2-cycle. | 4-cycle, medium-duty. | 2-cylinder 2-cycle gasoline. | 4-cycle. |
| (c) When built..... | 1910. | 1912. | Unknown. | 1913. | 1913. |
| (d) Make..... | Buffalo. | Barker & Cardy Machine Co. | Regal Gasoline Engine Co. | Termet & Monahan, Oshkosh, Wis. | Strellinger Marine Engine Co. |
| (e) Number of cylinders (one engine). | 4. | 1. | 1. | 2. | 1. |
| (f) Diameter of cylinder. | 5 inches. | 4½ inches. | 5½ inches. | About 4 inches. | 4½ inches. |
| (g) Stroke..... | 6 inches. | 5 inches. | 5½ inches. | do. | 6 inches. |
| (h) Revolutions per minute. | 600. | 500. | 160 to 400. | 610. | 600. |
| (i) Rated brake horsepower (total). | 24. | 4. | 5. | 8. | 4 to 6. |
| (j) Weight of one motor. | 1,050 pounds. | 130 pounds. | 500 pounds. | 650 pounds. | 330 pounds. |
| 16. Propeller: | | | | | |
| (a) Number of blades. | 3. | 3. | 3. | 3. | 3. |
| (b) Diameter..... | 22 inches. | 16 inches. | 19 inches. | 18 inches. | 18 inches. |
| (c) Pitch..... | 33 inches. | 20 inches. | 23 inches. | About 23 inches. | 16 inches. |
| (d) Diameter of shaft. | 1½ inches. | 1 inch. | 1 inch. | 1 inch. | 1 inch. |
| 17. Heating system: | | | | | |
| (a) Type..... | None. | None. | None. | None. | None. |
| (b) Size of heater. | do. | do. | do. | do. | do. |
| (c) Number of radiators. | do. | do. | do. | do. | do. |
| 18. Electric-light plant: | | | | | |
| (a) Make..... | None. | do. | None. | do. | do. |
| (b) Type of motor. | do. | do. | do. | do. | do. |
| (c) Brake horsepower. | do. | do. | do. | do. | do. |
| (d) Revolutions per minute. | do. | do. | do. | do. | do. |
| (e) Capacity of generator in kilowatts. | do. | do. | do. | do. | do. |
| (f) Number of lights. | do. | do. | do. | do. | do. |
| (g) Average candlepower per light. | do. | do. | do. | do. | do. |
| (h) Diameter of lantern. | do. | do. | do. | do. | do. |
| 19. Number of hours in crew. | 1. | (i) | (i) | 1. | 1. |

TABLE XVII.—*Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued*

| Name..... | D'Armit. | Dauphin. | Dawho. | Delafield. | Delaware. |
|---|------------------------|---|---|----------------------------|-----------------------|
| 1. District..... | Jacksonville, Fla..... | Mobile, Ala..... | Charleston, S. C..... | New York..... | Philadelphia, Pa..... |
| 2. Where built..... | Racine, Wis..... | Gulfport, Miss..... | City Island, N. Y..... | North Tonawanda, N. Y..... | Camden, N. J..... |
| 3. When built..... | 1913..... | 1913..... | 1909..... | 1913..... | 1908..... |
| 4. Builder..... | Racine Boat Co..... | Thomas M. Favre..... | Robert Jacob..... | Niagara Motor Boat Co..... | Vaughn Bros..... |
| 5. Time to build..... | Not known..... | 7 months..... | Unknown..... | 2 months..... | 3 months..... |
| 6. Where purchased..... | Racine, Wis..... | Racine, Wis..... | Rochester, N. Y..... | Albany, N. Y..... | |
| 7. When purchased..... | 1913..... | 1913..... | October, 1910..... | 1913..... | |
| 8. From whom purchased..... | Racine Boat Co..... | Racine Boat Co..... | T. B. Pritchard..... | Niagara Motor Boat Co..... | |
| 9. Purchase price..... | \$1,880..... | \$17,183.69..... | \$8,000..... | \$3,626..... | \$450..... |
| 10. Contract cost..... | \$1,880..... | \$17,958.82..... | Unknown..... | \$4,980..... | \$400..... |
| 11. Complete cost with outfit..... | \$1,880..... | \$14,800..... | \$8,000..... | \$3,030..... | \$75..... |
| 12. Present value..... | Wood..... | Wood, cypress frames, and planking..... | Long-leaf yellow-pine plank-ing, oak frame..... | Wood..... | Wood..... |
| 13. Hull: | | | | | |
| (a) Material of hull..... | 35 feet..... | 80 feet 4½ inches..... | 60 feet..... | 39 feet 6 inches..... | 20 feet 2 inches..... |
| (b) Length over all line..... | 31 feet..... | 75 feet..... | 50 feet 5 inches..... | 37 feet 6 inches..... | 19 feet..... |
| (c) Length on water line..... | 8 feet 3 inches..... | 17 feet 1½ inches..... | 14 feet..... | 9 feet 6 inches..... | 6 feet 8 inches..... |
| (d) Beam over all line..... | 7 feet 5 inches..... | 6 feet 4 inches..... | 11 feet..... | 7 feet 10 inches..... | 6 feet 8 inches..... |
| (e) Beam on water line..... | 5 feet 4 inches..... | 6 feet 3 inches..... | 8 feet..... | 6 feet 6 inches..... | 3 feet 6 inches..... |
| (f) Depth of hull forward..... | 4 feet 6 inches..... | 4 feet 6 inches..... | 7 feet 3 inches..... | 5 feet 9 inches..... | 3 feet 3 inches..... |
| (g) Depth of hull amidships..... | 2 feet 2 inches..... | 4 feet 7 inches..... | 6 feet 10 inches..... | 3 feet..... | 3 feet 4 inches..... |
| (h) Depth of hull aft..... | 2 feet 4 inches..... | 24 inches..... | 24 inches..... | 1 foot 9 inches..... | 1 foot..... |
| (i) Draft forward..... | 2 feet 7 inches..... | 4 feet 7 inches..... | 4 feet 2 inches..... | 3 feet 2 inches..... | 2 feet..... |
| (j) Draft aft..... | 2 feet 4 inches..... | 4 feet 4 inches..... | 3 feet 6 inches..... | 3 feet 5 inches..... | 1 foot 8 inches..... |
| (k) Draft to bottom of propeller..... | 5 inches..... | 3 inches..... | 6 inches..... | 4 inches..... | 3 inches..... |
| (l) Depth of keel from bottom of outside of planking..... | 4.3..... | 55.7..... | 20..... | 8..... | 2..... |
| (m) Displacement (long tons)..... | 9.17..... | 9, average..... | 10..... | 10.7..... | 8..... |
| (n) Speed in statute miles per hour..... | 24 feet..... | 55½ feet (lower house)..... | Raised above-deck type..... | 16 feet 6 inches..... | |
| 14. House: | | | | | |
| (a) Length..... | 7 feet 6 inches..... | 11½ feet..... | 14 feet..... | 6 feet 6 inches..... | |
| (b) Width..... | 2 feet 4 inches..... | 7 feet (lower house)..... | 2 feet..... | 1 foot 10 inches..... | |
| (c) Height above deck..... | | | | | |

| 14. Motor: | | Stova. | | | | | | | |
|---|------------------------|-----------------------------------|---|---|---|------------------------|------------------------|--|--|
| (a) Number..... | 1..... | 2..... | 1..... | 4-cylinder..... | 1..... | Medium duty..... | 1..... | Gasoline, 4-cycle..... | 1..... |
| (b) Type..... | 1913..... | 4-cylinder, marine..... | 1909..... | 1912..... | 4-cylinder..... | 1918..... | 1918..... | 1908..... | 1908..... |
| (c) When built..... | Campbell Motor Co..... | Walverine..... | Standard Motor Construction Co..... | Walverine..... | Standard Motor Construction Co..... | Murray & Fregutha..... | Murray & Fregutha..... | Vaughn Bros..... | Vaughn Bros..... |
| (d) Make..... | 4..... | 3..... | 6..... | 6..... | 6..... | 4..... | 4..... | 2..... | 2..... |
| (e) Number of cylinders (one engine)..... | 54 inches..... | 94 inches..... | 6 inches..... | 6 inches..... | 6 inches..... | 6 inches..... | 6 inches..... | 6 inches..... | 6 inches..... |
| (f) Diameter of cylinder..... | 64 inch..... | 12 inches..... | 8 inches..... | 8 inches..... | 8 inches..... | 8 inches..... | 8 inches..... | 7 inches..... | 7 inches..... |
| (g) Stroke..... | 432..... | 216, average..... | 350..... | 350..... | 350..... | 400-440..... | 400-440..... | 300..... | 300..... |
| (h) Revolutions per minute..... | 28..... | 100..... | 40 to 50..... | 40 to 50..... | 40 to 50..... | 30-40..... | 30-40..... | 6..... | 6..... |
| (i) Rated brake horsepower (total)..... | 1,225 pounds..... | 6,720 pounds complete..... | 3,500 pounds..... | 3,500 pounds..... | 3,500 pounds..... | 3,000 pounds..... | 3,000 pounds..... | 400 pounds..... | 400 pounds..... |
| (j) Weight of one motor..... | 3..... | 3..... | 3..... | 3..... | 3..... | 3..... | 3..... | 2..... | 2..... |
| 16. Propeller: | | | | | | | | | |
| (a) Number of blades..... | 28 inches..... | 40 inches..... | 38 inches..... | 38 inches..... | 38 inches..... | 24 inches..... | 24 inches..... | 18 inches..... | 18 inches..... |
| (b) Diameter..... | 30 inches..... | 18 inches..... | 48 inches..... | 48 inches..... | 48 inches..... | 36 inches..... | 36 inches..... | 20 inches..... | 20 inches..... |
| (c) Pitch..... | 14 inches..... | 24 inches..... | 24 inches, Robin bronze..... | 24 inches, Robin bronze..... | 24 inches, Robin bronze..... | 14 inches..... | 14 inches..... | 14 inches..... | 14 inches..... |
| (d) Diameter of shaft..... | None..... | Kerosene oil heaters..... | None..... | None..... | None..... | None..... | None..... | None..... | None..... |
| 17. Heating system: | | | | | | | | | |
| (a) Type..... | do..... | Barter No. 6..... | None..... | None..... | None..... | None..... | None..... | None..... | None..... |
| (b) Size of heater..... | do..... | None; 4 oil heaters are used..... | None..... | None..... | None..... | None..... | None..... | None..... | None..... |
| (c) Number of radiators..... | do..... | None; 4 oil heaters are used..... | None..... | None..... | None..... | None..... | None..... | None..... | None..... |
| 18. Electric-light plant: | | | | | | | | | |
| (a) Make..... | Dayton..... | Carlisle Finch..... | Lebby ignition and lighting system..... | Lebby ignition and lighting system..... | Lebby ignition and lighting system..... | Ward-Leonard..... | Ward-Leonard..... | Dynamo belt driven from main engine..... | Dynamo belt driven from main engine..... |
| (b) Type of motor..... | Direct current..... | 4-cycle, 2-cylinder..... | 4-cycle, 2-cylinder..... | 4-cycle, 2-cylinder..... | 4-cycle, 2-cylinder..... | 1,200..... | 1,200..... | 324..... | 324..... |
| (c) Brake horsepower..... | 1,260..... | 750..... | 0.115..... | 0.115..... | 0.115..... | 12..... | 12..... | 12..... | 12..... |
| (d) Revolutions per minute..... | 8..... | 48..... | 10..... | 10..... | 10..... | 12..... | 12..... | 12..... | 12..... |
| (e) Capacity of generator in kilowatts..... | 8..... | 16..... | 4..... | 4..... | 4..... | 11 inches..... | 11 inches..... | 11 inches..... | 11 inches..... |
| (f) Number of lights..... | None..... | 9 inches..... | 2..... | 2..... | 2..... | 1..... | 1..... | 1..... | 1..... |
| (g) Average candle-power light..... | | | | | | | | | |
| (h) Diameter of searchlight..... | | | | | | | | | |
| 19. Number of men in crew..... | 1..... | 4..... | 2..... | 2..... | 2..... | 1..... | 1..... | No regular crew..... | No regular crew..... |

TABLE XVII.—Report of operations of gasoline launches (acrew) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | D'Armit. | Dauphin. | Dawho. | Delafield. | Delaware. |
|--|---|---|---|---|---|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | \$940.00 | \$4,735.74 | \$2,216.67 | \$1,080.00 | ..... |
| 21. Subsistence..... | (1) | 1,105.47 | 1,344.97 | ..... | ..... |
| 22. Fuel..... | 690.33 | 1,309.44 | 790.64 | 1,255.25 | \$122.85 |
| 23. Supplies (machinery)..... | 61.12 | 53.84 | 20.90 | ..... | .35 |
| 24. Repairs..... | | | | | |
| (a) Hull..... | 47.25 | 894.41 | 83.34 | 81.44 | ..... |
| (b) Machinery..... | 180.49 | 135.75 | 318.43 | 15.00 | 32.10 |
| 25. Additions and alterations..... |  |  |  |  | ..... |
| 26. Miscellaneous..... | 83.15 | 471.78 | 235.39 | 104.11 | ..... |
| 27. Total..... | \$1,981.34 | \$8,726.43 | \$4,020.34 | \$2,535.80 | \$155.30 |
| 28. Approximate number of miles run during year..... | 6,615 ² | 4,960 | 4,942 | 7,432 | 3,348. |
| 29. Number of days in commission..... | 365 | 191 | 352 | 250 | 215. |
| 30. Cost of fuel per gallon..... | 18½ cents | 13 to 22.5 cents. | 22½ to 24½ cents. | 24 cents | 22 cents, average. |
| | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> |
| | Operated during the year as an inspection and survey boat on the St. Johns River, Fla., between Jacksonville and the ocean, and on the channel between the St. Johns River and Cumberland Sound, Ga. and Fla.
¹ Subsistence furnished by Mayport survey party, of which 149 miles was towing. | Used as survey and inspection boat in various harbors in the Mobile, Ala. district, and as tender for barge L in removing wrecks from Mobile outer bar.
The operating cost shown above includes \$817.43 expended on account of storm damage due to hurricane of July 6, 1916. | Operated principally in Charleston Harbor and Ashley River, S. C., and used on examinations and surveys, including inspection of dredging and other works in district. In addition to usual duties of operating the boat all members of the crew assisted in taking soundings on surveys, setting range marks, and other miscellaneous work.
¹ Subsistence furnished only for surveys and inspection trips to crews and other employees aboard. | Employed on surveys between Rondout and Waterford, N. Y., in connection with the improvement of Hudson River, N. Y. | In Delaware River in survey work and inspection of dredging between Philadelphia, Pa., and Trenton, N. J. |

| Name..... | Derby, Capt. Geo. H. | Deato. | Dolly. | Don. | Drft. |
|---|--|---|------------------------|-------------------------------------|--------------------|
| 1. District..... | First district, New York City. | Jacksonville, Fla. | Second, Portland, Ore. | Detroit, Mich. | Second, New York. |
| 2. Where built..... | Wilmington, Del. | New York, N. Y. | Morris Heights, N. Y. |do..... | Brooklyn, N. Y. |
| 3. When built..... | 1915. | 1905. | 1889. | 1904. | May, 1916. |
| 4. Builder..... | Smith & Baxter (Inc.) | Gas Engine & Power Co. | Gas Engine & Power Co. | Carl Breikart. | W. C. Diabrow, Jr. |
| 5. Time to build..... | 4 months. | Not known. | New York, N. Y. | About 4 months. | New York City. |
| 6. When purchased..... | ..... | 1911. | 1900. | Detroit, Mich. | 1916. |
| 7. From whom purchased..... | Cox & Stevens | 1911. | Gas Engine & Power Co. | Dr. Wadsworth Warren. | W. C. Diabrow, Jr. |
| 8. Purchase price..... | \$4,361. | \$7,500. | \$1,273.25. | \$2,170. | \$592. |
| 9. Contract cost..... | \$4,946. | Included in cost of boat. | \$1,343. | | \$599. |
| 10. Complete cost with outfit..... | | | | | |
| 11. Present value..... | \$4,305. | \$5,400. | \$100. | \$1,400. | \$600. |
| 12. Hull: | | | | | |
| (a) Material of hull..... | Wood. | Wood. | Wood. | Oak and cypress. | Wood. |
| (b) Length over all..... | 44 feet. | 63 feet 2 inches. | 25 feet 2 inches. | 41 feet 9 inches. | 41 feet 9 inches. |
| (c) Length on water line..... | 42 feet 8 inches. | 58 feet 6 inches. | 23 feet 3 inches. | 41 feet 2 inches. | 41 feet 2 inches. |
| (d) Beam over all..... | 10 feet 8 inches. | 10 feet 7 inches. | 5 feet 10 inches. | 9 feet 7 inches. | 5 feet. |
| (e) Beam on water line..... | 10 feet 2 inches. | | 5 feet. | 9 feet. | |
| (f) Depth of hull forward..... | 6 feet 10 inches. | 5 feet 1 inch. | 3 feet. | 2 feet 8 inches. | |
| (g) Depth of hull amidships..... | 6 feet 10 inches. | 5 feet 1 inch. | 2 feet 6 inches. | 4 feet 7 inches. | |
| (h) Depth of hull aft..... | 3 feet 6 inches. | 4 feet 8 inches. | 2 feet 8 inches. | 4 feet 6 inches. | |
| (i) Draft forward..... | 2 feet 8 inches. | 2 feet 6 inches. | 1 foot. | 1 foot 1 inch. | 1 foot. |
| (j) Draft aft..... | 4 feet. | 3 feet 6 inches. | 1 foot 6 inches. | 3 feet. | |
| (k) Draft to bottom of propeller..... | 3 feet 8 inches. | 3 feet 6 inches. | 1 foot 4 inches. | 2 feet 10 inches. | |
| (l) Depth of keel from bottom of outside of planking..... | 14 inches to 2 feet 4 inches. | 6 inches. | 4 inches. | 24 inches. | |
| (m) Displacement (long tons)..... | 15.1. | 14, estimated. | 24. | 9. | 4 ton. |
| (n) Speed in statute miles per hour..... | 9.4. | 14. | 6. | 10. | 8. |
| 14. House: | | | | | |
| (a) Length..... | 10 feet forward, 10 feet aft. | 13 feet 3 inches forward house, 18 feet 6 inches after house. | None. | 16 feet 6 inches. | None. |
| (b) Width..... | 7 feet forward, 7 feet 3 inches aft. | 8 feet 7 inches forward house, 9 feet 2 inches after house. | | 8 feet 9 inches. | |
| (c) Height above deck..... | 1 foot 6 inches forward, 2 feet 10 inches aft. | 3 feet 2 inches. | | 2 feet 4 inches to 3 feet 2 inches. | |

| power per light | | 9 inches. | | No regular crew. | | No searchlight. | | 1 | |
|--|------------|---|--|--|--|---------------------------------------|--|-----|--|
| (A) Diameter of searchlight. | | 3. | | 1 | | 2 | | 1 | |
| 19. Number of men in crew | | | | | | | | | |
| OPERATING COST. | | | | | | | | | |
| 20. Pay roll..... | \$1,100.00 | \$3,180.00 | | 1 \$77.25 | | \$1,080.00 | | | |
| 21. Subsistence..... | | 1,012.06 | | 31.69 | | 97.20 | | | |
| 22. Fuel..... | 827.45 | 1,131.80 | | 18.16 | | 13.40 | | | |
| 23. Supplies (machinery)..... | 35.50 | 157.17 | | | | | | | |
| 24. Repairs: | | | | | | | | | |
| (a) Hull..... | 32 | 37.45 | | 37.03 | | | | | |
| (b) Machinery..... | 25.16 | 308.18 | | 9.40 | | | | | |
| 25. Additions and alterations..... | 11.62 | | | | | 636.70 | | | |
| 26. Miscellaneous..... | 9.04 | 278.50 | | | | 46.73 | | | |
| 27. Total..... | \$2,093.09 | \$6,105.16 | | | | \$1,883.97 | | | |
| 28. Approximate number of miles run during year..... | 6,686 | 6,721 | | 280 | | \$172.53 | | | |
| 29. Number of days in commission..... | 356 | 368 | | 18 | | | | 180 | |
| 30. Cost of fuel per gallon..... | \$0.23 | 21.1 cents | | 21 cents | | 17.3 to 20 cents | | | |
| | | <i>Remarks.</i> | | <i>Remarks.</i> | | <i>Remarks.</i> | | | |
| Used as a survey tender on river and harbor work in the southern section of the first district, New York City. | | Operated during the year as an inspection, survey, and dispatch boat and in towing on the waterways of the west coast of Florida.
Of which 590 miles was towing. | | Operated at Government moorings below Portland, Oreg., in dispatch work, etc.
Includes labor cost in repairing machinery. | | Harbor of refuge, Harbor Beach, Mich. | | | |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Du Bré. | Echo Rivr. | Elia. | Engineer. | Engineer. |
|--|--------------------------------------|---|--|-------------------------|--|
| 1. District..... | Louisville, Ky..... | Louisville, Ky..... | New London, Conn..... | Grand Rapids, Mich..... | Washington Barracks, D. C.
New York City. |
| 2. Where built..... | Madison, Ind..... | Louisville, Ky., rebuilt
Woodbury, Ky..... | Marblehead, Mass..... | do..... | do..... |
| 3. When built..... | Unknown..... | 1911; rebuilt 1913..... | 1911..... | 1902..... | 1898..... |
| 4. Builder..... | do..... | United States..... | James E. Graves..... | United States..... | Gas Engine & Power Co.,
New York City. |
| 5. Time to build..... | do..... | 4 months (about)..... | Unknown..... | do..... | Unknown..... |
| 6. Where purchased..... | Madison, Ind..... | do..... | Boston, Mass..... | do..... | 1898..... |
| 7. When purchased..... | 1912..... | do..... | 1914..... | do..... | 1898..... |
| 8. From whom purchased..... | George H. Simpson..... | do..... | Murray & Tregurtha Co..... | do..... | Gas Engine & Power Co.,
New York City. |
| 9. Purchase price..... | \$300..... | do..... | \$2,100..... | do..... | \$1,800..... |
| 10. Contract cost..... | do..... | do..... | Unknown..... | do..... | \$1,800..... |
| 11. Complete cost with outfit..... | \$300..... | \$2,605.45..... | \$2,100..... | \$1,600..... | \$2,385..... |
| 12. Present value..... | \$150 (hull)..... | \$2,500..... | do..... | \$700..... | \$225..... |
| 13. Hull: | Wood..... | Wood..... | Wood..... | Wood..... | Wood..... |
| (a) Material of hull..... | 28 feet 6 inches..... | 40 feet 5 inches..... | 33 feet..... | 37 feet 6 inches..... | 30 feet..... |
| (b) Length over all..... | 28 feet..... | 40 feet 5 inches..... | 33 feet..... | 37 feet 6 inches..... | 37 feet 2½ inches..... |
| (c) Length on water..... | 28 feet..... | 40 feet 5 inches..... | 33 feet..... | 37 feet 6 inches..... | 37 feet 2½ inches..... |
| (d) Beam over all..... | 5 feet..... | 9 feet 6 inches..... | 9 feet 2 inches..... | 7 feet 8 inches..... | 6 feet 6 inches..... |
| (e) Beam on water..... | 4 ft., 4 feet; amidship, 4 feet..... | 8 feet 3 inches..... | 9 feet 2 inches..... | 6 feet 4 inches..... | 6 feet 3½ inches..... |
| (f) Depth of hull forward..... | 3 feet 2½ inches..... | 5 feet 10 inches..... | 4 feet 7 inches..... | 2 feet 5 inches..... | 4 feet 3 inches..... |
| (g) Depth of hull amidship..... | 2 feet 10 inches..... | 4 feet 8 inches..... | 3 feet 1 inch..... | 2 feet 3 inches..... | 3 feet 7 inches..... |
| (h) Depth of hull aft..... | 2 feet..... | 3 feet..... | 2 feet 8 inches..... | 2 feet..... | 3 feet 10 inches..... |
| (i) Draft forward..... | 15 inches..... | 2 feet 2 inches..... | 2 feet 7 inches..... | 1 foot 11 inches..... | 1 foot 9 inches..... |
| (j) Draft at bottom..... | 2 feet 7 inches..... | 3 feet 6 inches..... | 2 feet 9 inches..... | 2 feet 8 inches..... | 2 feet 7 inches..... |
| (k) Draft to bottom of propeller..... | No keel..... | ¾ inch..... | Forward, 5 inches; amidship, 6 inches; aft, 2 feet 5 inches..... | 2 feet 10 inches..... | 2 feet 5 inches..... |
| (l) Depth of keel from bottom of outside of plating..... | 1.9..... | 6..... | 7½..... | 10½..... | 4..... |
| (m) Displacement (dead weight)..... | 12..... | 11..... | 9 to 10..... | 9..... | 9..... |
| (n) Speed in miles per hour..... | do..... | do..... | do..... | do..... | do..... |

13751—ENG 1917—287

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Du Bré. | Echo River. | Elita. | Engineer. | Engineer. |
|--|------------|---|--|--|--|
| 18. Electric light plant—Continued. | | | | | |
| (9) Average candle-power per light. | | | 10..... | do..... | No electric light plant. |
| (10) Diameter of searchlight. | | | 10 inches..... | do..... | |
| 19. Number of men in crew. | 1..... | 1..... | 1..... | 1..... | 1 (enlisted). |
| OPERATING COST. | | | | | |
| 20. Pay roll..... | | \$709.46 | \$692.94 | | |
| 21. Subsistence..... | | 36.20 | 299.25 | | |
| 22. Fuel..... | | 838.66 | 274.46 | \$188.20 | \$66.00 |
| 23. Supplies (machinery)..... | | 10.32 | 64.63 | 18.20 | 1.75 |
| 24. Repairs: | | | | | |
| (a) Hull..... | | | 300.24 | 34.64 | |
| (b) Machinery..... | | 291.00 | 293.15 | 56.43 | |
| 25. Additions and alterations. | \$32.67 | 1,077.31 | 251.22 | 1.75 | |
| 26. Miscellaneous..... | | 14.51 | 68.24 | 6.28 | |
| 27. Total..... | \$32.67 | \$2,980.36 | \$2,234.13 | \$273.50 | \$87.75 |
| 28. Approximate number of miles run during year. | 4,125..... | | 5,490..... | 1,550..... | 2,700..... |
| 29. Number of days in commission. | 154..... | | 236..... | 220..... | 135..... |
| 30. Cost of fuel per gallon..... | | Gasoline, 19 cents; lubricants, 40 cents. | 18, 22, 23, 24, 25, 27, and 28 cents. | 18.3 cents..... | 20 cents..... |
| | Remarks. | Remarks. | Remarks. | Remarks. | Remarks. |
| Not operated during the year. | | Employed on Green and Barren Rivers, Ky., in inspection service; transportation of employees and materials and miscellaneous towing, and as dredge tender. Includes cost of new hull and cabin. | Surveys, examinations, and inspections of the various rivers and harbors in the district and making trips to Island forts. | The launch was used by United States Inspector in connection with work of constructing breakwater at Manatee Harbor, Mich. | Running between Washington Barracks, D. C., and Fort Foote, Md., in connection with the instruction of engineer troops at the Engineer School. |

| Name..... | Engineer, U. S. | Engineer. | Event. | Event. | Expense. |
|---|----------------------------|-----------------------------|-----------------------|---------------------------|----------------------------------|
| 1. District..... | Newport, R. I..... | Kansas City, Mo..... | Montgomery, Ala..... | Nashville, Tenn..... | Montgomery, Ala. |
| 2. Where built..... | Morris Heights, N. Y..... | Long Island City, N. Y..... | No record..... | Grafton, Ill..... | St. Joseph, Mich. |
| 3. When built..... | 1893..... | 1897..... |do..... | 1912..... | 1905..... |
| 4. Builder..... | Gas Engine & Power Co..... | Unknown..... |do..... | Hipley Steel Boat Co..... | Trusscott Boat Manufacturing Co. |
| 5. Time to build..... | Not known..... |do..... |do..... |do..... | No record. |
| 6. Where purchased..... | Morris Heights, N. Y..... | Long Island City, N. Y..... | Columbus, Ga..... | Nashville, Tenn..... | St. Joseph, Mich. |
| 7. When purchased..... | 1893..... | 1897..... | 1910..... | 1913..... | 1905..... |
| 8. From whom purchased..... | Gas Engine & Power Co..... | Unknown..... | T. C. Hudson..... | Julian Brown..... | Trusscott Boat Manufacturing Co. |
| 9. Purchase price..... | \$2,090..... | \$2,300..... | \$175..... | \$300..... | \$950. |
| 10. Contract cost..... | \$2,090..... | ..... | \$175..... | ..... | \$950. |
| 11. Complete cost with outfit..... | \$300..... | \$270..... | \$475..... | \$174..... | \$550. |
| 12. Present value..... | Wood..... | Wood..... | Wood..... | Galvanized iron..... | Wood. |
| 13. Hull: | (a) Material of hull..... | 30 feet..... | 25 feet 6 inches..... | 21 feet 8 inches..... | 27 feet 6 inches. |
| (b) Length over all..... | 27 feet..... | 28 feet..... | 25 feet..... | 21 feet 2 inches..... | 27 feet 6 inches. |
| (c) Length on water line..... | 6 feet 5 inches..... | 7 feet..... | 6 feet 6 inches..... | 5 feet 5 inches..... | 7 feet 3 inches. |
| (d) Beam over all..... | 5 feet 6 inches..... | 6 feet 5 inches..... | 5 feet 6 inches..... | 5 feet..... | 6 feet 10 inches. |
| (e) Beam on water line..... | 3 feet 8 inches..... | 3 feet..... | 3 feet 2 inches..... | 2 feet 5 inches..... | 3 feet. |
| (f) Depth of hull forward..... | 3 feet 2 inches..... | 3 feet..... | 2 feet 10 inches..... | 2 feet 4 inches..... | 2 feet 4 inches. |
| (g) Depth of hull amidships..... | 3 feet..... | 1 foot 1 1/2 inches..... | 2 feet 4 inches..... | 7 feet 2 inches..... | 2 feet 6 inches. |
| (h) Depth of hull aft..... | 1 foot 3 inches..... | 1 foot..... | 10 inches..... | 7 inches..... | 1 foot 6 inches. |
| (i) Draft forward..... | 3 feet..... | 1 foot 8 inches..... | 1 foot 10 inches..... | 1 inch..... | 1 foot 6 inches. |
| (j) Draft aft..... | 2 feet 3 inches..... | 1 foot 8 inches..... | 2 feet 5 inches..... | 1 foot 5 inches..... | 1 foot 6 inches. |
| (k) Draft to bottom of propeller..... | 4 inches..... | No keel..... | 1 foot 4 inches..... | 1 foot 8 inches..... | Flat bottom. |
| (l) Depth of keel from bottom of outside of planking..... | 6.3..... | 3..... | 2..... | 1..... | 4. |
| (m) Displacement (long tons)..... | 8.25..... | 8..... | 8..... | 6 to 7..... | 10. |
| (n) Speed in statute miles per hour..... | None..... | None..... | None..... | None..... | 15 feet 5 inches. |
| 14. House: | (a) Length..... | None..... | None..... | None..... | 6 feet 3 inches. |
| (b) Width..... | None..... | None..... | None..... | None..... | 4 feet 1 inch. |
| (c) Height above deck..... | None..... | None..... | None..... | None..... | Seats 12 men. |
| (d) Accommodations..... | None..... | None..... | None..... | None..... | Seats 12 men. |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Engineers, U. S. | Ensigns. | Ensigns. | Ensigns. |
|---|-------------------|---------------|------------------|-----------------|
| 15. Motors: | | | | |
| (a) Number..... | 1 | 1 | 1 | 1 |
| (b) Type..... | 2-cycle | 2-cycle | 2-cycle | 2-cycle |
| (c) When built..... | 1914 | 1912 | 1911 | 1908 |
| (d) Make..... | J. W. Lathrop Co. | J. W. Lathrop | Tuttle Motor Co. | Gray Motor Co. |
| (e) Number of cylinders (1 engine)..... | 2 | 1 | 2 | 2 |
| (f) Diameter of cylinder..... | 5½ inches | 4½ inches | 4½ inches | 5 inches |
| (g) Stroke..... | 6½ inches | 4 inches | 4 inches | 5½ inches |
| (h) Revolutions per minute..... | 450 | 700 | 450 | 550 |
| (i) Rated brake horsepower (total)..... | 12 | 10 | 4 | 20 |
| (j) Weight of 1 motor..... | 880 pounds | 160 pounds | 160 pounds | 520 pounds |
| 16. Propeller: | | | | |
| (a) Number of blades..... | 3 | 3 | 3 | 3 |
| (b) Diameter..... | 22 inches | 18 inches | 18 inches | 1 foot 3 inches |
| (c) Pitch..... | 30 inches | 20 inches | 24 inches | 22 inches |
| (d) Diameter of shaft..... | 1½ inches | 1 inch | 1½ inches | 1½ inches |
| 17. Heating system: | | | | |
| (a) Type..... | None | None | None | None |
| (b) Size of heater..... | | | | |
| (c) Number of radiators..... | | | | |
| 18. Electric-light plant: | | | | |
| (a) Make..... | None | None | None | None |
| (b) Type of motor..... | | | | |
| (c) Brake horsepower..... | | | | |
| (d) Revolutions per minute..... | | | | |
| (e) Capacity of generator in kilowatts..... | | | | |
| (f) Number of lights..... | | | | |
| (g) Average candlepower..... | | | | |
| (h) Diameter of searchlight..... | | | | |

[illegible]

TABLE XVII.—*Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Eureka. | Faber. | Frances. | Franklin. | Frank. |
|--|------------------------|--|---------------------|------------------------------|-------------------------------------|
| 1. District..... | Second, Portland, Ore. | Wilmington, N. C. | Wilmington, N. C. | Vicksburg, Miss. | Jacksonville, Fla. |
| 2. Where built..... | Wilmington, Del. | Berwick, La. | Muskegon, Mich. | Grafton, Ill. | Bradentown, Fla. |
| 3. When built..... | 1908. | 1897. | 1906; rebuilt 1911. | 1914. | 1909. |
| 4. Builder..... | Unknown. | Unknown. | Racine Boat Co. | Ripley Steel Boat & Mfg. Co. | Asa Pillsbury. |
| 5. Time to build..... | ..... | ..... | Unknown. | 3 months. | 1 month. |
| 6. Where purchased..... | ..... | Wilmington, N. C. | Beaufort, N. C. | Grafton, Ill. | ..... |
| 7. When purchased..... | ..... | 1914. | 1908. | 1914. | ..... |
| 8. From whom purchased..... | ..... | Bowers Southern Dredging Co. | W. L. Arendell. | Ripley Steel Boat & Mfg. Co. | ..... |
| 9. Purchase price..... | ..... | Included in cost of Henry Bacon and plant. | \$600. | \$558.39 | ..... |
| 10. Contract cost..... | ..... | Unknown. | ..... | \$558.39 | \$530. |
| 10. Complete cost with outfit..... | ..... | ..... | \$2,000. | \$558.39 | Included in contract cost. |
| 12. Present value..... | \$150. | \$1,800. | \$2,300. | \$450. | \$225. |
| 13. Hull: | | | | | |
| (g) Material of hull..... | Wood. | Wood. | Wood. | Steel. | Wood. |
| (h) Length over all..... | 25 feet. | 42 feet. | 43 feet. | 29 feet. | 28 feet. |
| (c) Length on water line..... | 23 feet. | 38 feet 6 inches. | 40 feet. | 29 feet 7 inches. | 26 feet 10 inches. |
| (d) Beam over all..... | 8 feet 6 inches. | 10 feet. | 7 feet 10 inches. | 7 feet. | 8 feet. |
| (e) Beam on water line..... | 7 feet 3 inches. | 9 feet. | 7 feet 6 inches. | 5 feet 6 inches. | 6 feet 9 inches. |
| (f) Depth of hull forward..... | 4 feet 4 inches. | 4 feet. | 4 feet 6 inches. | 3 feet 10 inches. | 3 feet 3 inches. |
| (g) Depth of hull amidships..... | 3 feet 4 inches. | 4 feet. | 4 feet. | 3 feet. | 3 feet. |
| (h) Depth of hull aft..... | 2 feet 6 inches. | 4 feet. | 4 feet 6 inches. | 2 feet. | 2 feet. |
| (i) Draft forward..... | 1 foot. | 2 feet 4 inches. | 1 foot 6 inches. | 1 foot 6 inches. | 3 inches. |
| (j) Draft aft..... | 2 feet 4 inches. | 3 feet 10 inches. | 2 feet 6 inches. | 1 foot 2 inches. | 1 foot. |
| (k) Draft to bottom of propeller..... | 2 feet 1½ inches. | 3 feet 7 inches. | 2 feet 4 inches. | 1 foot 3 inches. | 11 inches. |
| (l) Depth of keel from bottom of planking..... | 3 inches. | 3 inches. | 5 inches. | 1½ inches. | No keel. |
| (m) Displacement (long tons)..... | 3. | 10. | 7. | 3. | 2.5. |
| (n) Speed in statute miles per hour..... | 6. | 8. | 7. | 7. | 8.5. |
| 14. House: | | | | | |
| (a) Length..... | None. | 24 feet. | 28 feet. | ..... | None; open cockpit with canopy top. |
| (b) Width..... | ..... | 7 feet 7 inches. | 6 feet 10 inches. | ..... | ..... |

| | | | | | |
|---|------------------------------------|------------------------------------|---|----------------|------------------------------|
| (c) Height above deck. | 3 feet 4 inches. | 3 feet forward, 34 feet aft. | | | |
| (d) Accommodations | Sleeping accommodations for 3 men. | Sleeping accommodations for 4 men. | | | |
| 13. Motors: | | | | | |
| (a) Number. | 1. | 1. | 1. | 1. | 1. |
| (b) Type. | 4-cycle. | 4-cycle. | 4-cycle. | 2-cycle. | 2-cycle. |
| (c) When built. | 1907. | 1911. | 1910. | 1914. | 1888. |
| (d) Make. | Harris. | Wolverine. | Lamb. | Gray Motor Co. | Orlale, Page Engineering Co. |
| (e) Number of cylinders. | 2. | 3. | 4. | 2. | 2. |
| (f) Inders (1 engine). | | | | | |
| (g) Diameter of cylinder. | 5 inches. | 54 inches. | 54 inches. | 44 inches. | 44. |
| (h) Stroke. | 54 inches. | 5 inches. | 5 inches. | 4 inches. | 5 inches. |
| (i) Revolutions per minute. | 330 to 400. | 350. | 350. | 525. | 475. |
| (j) Rated brake horsepower (total). | 10. | 36. | 24. | 14. | 10. |
| (k) Weight of one motor. | 590 pounds. | 3,120 pounds. | 1,320 pounds. | 372 pounds. | 565 pounds. |
| 16. Propeller: | | | | | |
| (a) Number of blades. | 3. | 3. | 3. | 3. | 3. |
| (b) Diameter. | 24 inches. | 36 inches. | 24 inches. | 18 inches. | 224 inches. |
| (c) Pitch. | 22 inches. | 40. | 34 inches. | 224 inches. | 224 inches. |
| (d) Diameter of shaft. | 14 inches. | 24 inches. | 14 inches. | 14 inches. | 14 inches. |
| 17. Heating system: | | | | | |
| (a) Type. | None. | None. | None. | None. | None. |
| (b) Size of heater. | | | | | |
| (c) Number of radiators. | | | | | |
| 18. Electric-light plant: | | | | | |
| (a) Make. | None. | None. | Hector C. McRae. | Do. | Do. |
| (b) Type of motor. | | | Driven by belt and pulley from main engine. | Do. | Do. |
| (c) Brake horsepower. | | | | Do. | Do. |
| (d) Revolutions per minute. | | | 1,500. | Do. | Do. |
| (e) Capacity of generator in kilowatts. | | | 0.3. | Do. | Do. |
| (f) Number of lights. | | | 14. | Do. | Do. |
| (g) Average candle-power per light. | | | Thirteen 12-candlepower lights, one 20-candlepower searchlight. | Do. | Do. |
| (h) Diameter of searchlight. | | | 9 inches. | Do. | Do. |
| 19. Number of men in crew. | No regular crew. | 3. | 2. | 1. | Do. |

Data not available: original wheel lost.

None.

Do.

Do.

Do.

Do.

Do.

Do.

Do.

Do.

Do.

TABLE XVII.—Report of operations of gasoline launches (crew) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Evreka. | Fabr. | Frances. | Franklin. | Frank. |
|--|---|--|---|--|---|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | \$316.26 | \$1,678.83 | \$1,117.30 | (¹) | ..... |
| 21. Subsistence..... | ..... | ..... | 398.06 | ..... | ..... |
| 22. Fuel..... | 71.86 | 1,115.84 | 617.80 | \$234.92 | \$15.50 |
| 23. Supplies (machinery)..... | 18.79 | 25.83 | 63.91 | 37.68 | ..... |
| 24. Repairs: | | | | | |
| (a) Hull..... | 24.75 | \$2.32 | 39.70 | ..... | 2.50 |
| (b) Machinery..... | 48.20 | 1.40 | 62.70 | 7.21 | \$3.02 |
| 25. Additions and alterations..... | ..... | ..... | 85.59 | ..... | ..... |
| 26. Miscellaneous..... | ..... | ..... | 25.84 | ..... | ..... |
| 27. Total..... | \$478.85 | \$2,763.71 | \$2,300.99 | ..... | \$51.02 |
| 28. Approximate number of miles run during year..... | 377 | 5,210 | 4,163 | 1,700 | ..... |
| 29. Number of days in commission..... | 107 | 185 | 366 | 57 | ..... |
| 30. Cost of fuel per gallon..... | 19 cents. | \$0.22 + | ..... | 20.7 cents | ..... |
| | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> |
| | Operated on Columbia and lower Willamette Rivers, below Portland, Oreg., as tender for pile driver No. 2; also in dispatch work, etc., at Government moorings, below Portland. Includes cost of subsistence for operator. | This launch is used as a tender for the hydraulic pipe-line dredge Henry Bacon. The crew is regularly subsisted on the dredge Henry Bacon, and a separate subsistence account is not kept. | Operated on various rivers and harbors in the Newbern, N. C., subdistrict as survey boat. | Carrying miscellaneous supplies and towing coal from El Dorado landing to Lock and Dam No. 8; transporting survey party vicinity of Lock and Dam No. 8. Operated by lockmen. | Used as tender to U. S. snagboat <i>Kissimee</i> until Feb. 5, 1916, and then laid up with the snagboat in Jacks Branch near Fort Demaud. |

| Name..... | "G." | Gedna. | Gensawada. | Cownd. | Gazette. |
|---|-------------------|----------------------|------------------------|---------------------------|--|
| 1. District..... | Galveston, Tex. | Rock Island. | New York. | Wilmington, Del. | Newport, R. I. |
| 2. When built..... | Camden, N. J. | St. Paul, Minn. | North Tonawanda, N. Y. | Quincy, Mass. | Noank, Conn. |
| 3. Builder..... | 1908. | 1913. | 1913. | 1907. | 1890. |
| 4. Time to build..... | | 9 months. | Niagara Motor Boat Co. | Baker Yeacht Building Co. | |
| 5. When purchased..... | Camden, N. J. | St. Paul, Minn. | Albany, N. Y. | Unknown. | Block Island, R. I. |
| 6. From whom purchased..... | 1908. | 1913. | 1913. | 1910. | 1910. |
| 7. Purchase price..... | \$975. | \$1,724. | \$1,253.50. | James K. Clarke. | Ball Bros. |
| 8. Contract price..... | | \$1,724. | \$1,523.50. | \$11,000. | \$3,800. |
| 9. Complete cost with outfit..... | | \$1,724. | \$1,523.50. | \$11,000. | |
| 10. Present value..... | \$500. | \$1,107.22. | \$942. | \$13,000. | \$4,500. |
| 11. Hull: | | | | | |
| (a) Material of hull..... | Wood. | Wood. | Wood. | Wood. | Wood. |
| (b) Length over all..... | 25 feet 7 inches. | 35 feet. | 32 feet. | 72 feet. | 66 feet 6 inches. |
| (c) Length on water line..... | 24 feet. | 33 feet. | 31 feet 3 inches. | 68 feet. | 58 feet. |
| (d) Beam over all..... | 8 feet 2 inches. | 5 feet 8 inches. | 5 feet 6 inches. | 12 feet 6 inches. | 18 feet 2 inches. |
| (e) Beam on water line..... | 7 feet. | 3 feet 10 inches. | 5 feet. | 10 feet 2 inches. | 17 feet 6 inches. |
| (f) Depth of hull forward..... | 3 feet 6 inches. | 3 feet 4 inches. | 1 foot 8 inches. | 7 feet 4 inches. | 11 feet. |
| (g) Depth of hull amidships..... | 3 feet 1 inch. | 2 feet. | 2 feet 6 inches. | 5 feet 2 inches. | 10 feet 6 inches. |
| (h) Depth of hull aft..... | 2 feet 4 inches. | 7½ inches. | 2 feet 4 inches. | 3 feet 9 inches. | 10 feet 3 inches. |
| (i) Draft forward..... | 1 foot 3 inches. | 1½ inches. | 1 foot 8 inches. | 2 feet 9 inches. | 7 feet 6 inches. |
| (j) Draft aft..... | 2 feet. | 2 feet 7 inches. | 2 feet 4 inches. | 3 feet 8 inches. | 8 feet. |
| (k) Draft to bottom of propeller..... | 2 feet 3 inches. | 2 feet 1 inch. | 2 feet 4 inches. | 3 feet 8 inches. | 6 feet 3 inches. |
| (l) Depth of keel from bottom of outside of planking..... | 3 inches. | 1½ inches. | Keesoon timber only. | 1 foot 10 inches. | 1 foot 4 inches amidships. |
| (m) Displacement (long tons). | 1½ tons. | 1.5. | 4. | 20. | 73. |
| (n) Speed in statute miles per hour. | 8. | 16. | 18.5. | 12. | 7.8. |
| 14. House: | | | | | |
| (a) Length..... | 8 feet. | None. | | 41 feet. | 20 feet 8 inches. |
| (b) Width..... | 7 feet 6 inches. | | | 10 feet 4 inches. | 12 feet 3 inches aft, 9 feet 6 inches forward. |
| (c) Height above deck..... | 2 feet. | | | 3 feet. | 6 feet 6 inches. |
| (d) Accommodations..... | None. | Seats for 5 persons. | | 6 in addition to crew. | 3 staterooms, 1 drafting room, pilot house. |

TABLE XVII.—Report of operations of gasoline launches (arranged for the calendar year ending Dec. 31, 1916)—Continued.

| Name. | "G." | Galva. | Genasoda. | Genad. | Gazelle. |
|---|---------------|------------------------------------|------------------------|-----------------------------------|------------------------|
| 15. Motors: | | | | | |
| (a) Number. | 1. | 1. | 1. | 2. | 1. |
| (b) Type. | 4-cycle. | 4-cycle gasoline, reverse gear. | 4-cycle. | 4-cycle. | 4-cycle heavy-duty. |
| (c) When built. | 1913. | 1913. | 1913. | 1913. | 1916. |
| (d) Make. | Buffalo. | Auto Engine Works, St. Paul, Minn. | Fay & Bowen Engine Co. | Harris. | Murray & Tregurtha Co. |
| (e) Number of cylinders (1 engine). | 4. | 4. | 4. | 6. | 4. |
| (f) Diameter of cylinder. | 4 1/2 inches. | 5 1/2 inches. | 5 inches. | 6 1/2-inch bore. | 7 1/2 inches. |
| (g) Stroke. | 5 inches. | 6 inches. | 6 1/2 inches. | 6 1/2 inches. | 10 inches. |
| (h) Revolutions per minute. | 600. | Up to 1,000. | 80. | 400. | 325. |
| (i) Rated brake horsepower (total). | 15. | 40. | 35-45. | 40 to 50. | 60. |
| (j) Weight of 1 motor. | 600. | 750 pounds. | 800 pounds. | 3,500 pounds. | 4,500 pounds. |
| 16. Propeller: | | | | | |
| (a) Number of blades. | 3. | 3. | 3. | 3. | 3. |
| (b) Diameter. | 20 inches. | 20 inches. | 21 inches. | 33 inches. | 38 inches. |
| (c) Pitch. | 24 inches. | 28 inches. | 26 inches. | 38 inches. | 36 inches. |
| (d) Diameter of shaft. | 1 1/2 inches. | 1 1/2 inches. | 1 1/2 inches. | 3 inches. | 2 1/2 inches. |
| 17. Heating system: | | | | | |
| (a) Type. | None. | None. | None. | Hot water. | Store. |
| (b) Size of heater. | | | | No. 1 Ideal Premier water heater. | |
| (c) Number of radiators. | | | | 5. | |
| 18. Electric light plant: | | | | | |
| (a) Make. | None. | None. | None. | Edison. | None. |
| (b) Type of motor. | | | | Storage battery, 28 cells. | |
| (c) Brake horsepower. | | | | | |
| (d) Revolutions per minute. | | | | | |
| (e) Capacity of generator in kilowatts. | | | | | |
| (f) Number of lights. | | | | | |
| (g) Average candle power per light. | | | | | |
| (h) Diameter of searchlight. | | | | | |
| 19. Number of men in crew. | 1. | 1. | 1. | 4. | 5. |

OPERATING COST.

| | | | | | |
|--|--|--|------------------------------|--|---|
| 20. Pay roll..... | \$325.00 | \$480.00 | \$800.00 | \$2,955.20 | \$3,324.17 |
| 21. Subistence..... | 167.90 | 34.50 | | 822.02 | 854.40 |
| 22. Fuel..... | 361.23 | 270.19 | 804.20 | 675.17 | 100.10 |
| 23. Supplies (machinery)..... | 23.66 | 50.86 | 39.36 | 52.91 | 19.96 |
| 24. Repairs: | | | | | |
| (a) Hull..... | 345.19 | 68.11 | 8.98 | 420.65 | 246.06 |
| (b) Machinery..... | 243.96 | 111.19 | 152.70 | 81.49 | 149.04 |
| 25. Additions and alterations..... | 188.56 | | 68.55 | 83.77 | 2,625.00 |
| 26. Miscellaneous..... | 6.90 | 1.76 | 8.25 | 200.31 | 224.33 |
| 27. Total..... | \$2,132.40 | \$1,016.61 | \$2,078.04 | \$5,332.02 | \$7,753.30 |
| 28. Approximate number of miles run during year..... | 4,126 | 8,502 | | 1,615 | 1,213 |
| 29. Number of days in commission..... | | 200 | | 366 | 366 |
| 30. Cost of fuel per gallon..... | | \$0.1647 | | 10 cents from Jan. 1 to June 30, 1916; 24 cents from July 1 to Dec. 31, 1916 | 17.96 cents. |
| | | | | Remarks. | Remarks. |
| | Tender to survey party at Morgans Point. | Mississippi River division, Rock Island to Burlington. Supervision and inspection. | On upper Hudson River, N. Y. | On duty in connection with inspection and survey work. | Survey work, rivers and harbors. New motor installed in December, 1916. |

TABLE XVII.—*Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Grandy. | Hancock No. 2. | Harpeth. | Hartrick, E. M. | Helen. |
|---|---|-------------------------------|-----------------------|------------------------------|--|
| 1. District..... | Charleston, S. C..... | Grand Rapids, Mich..... | Nashville, Tenn..... | Galveston, Tex..... | Galveston, Tex. |
| 2. Where built..... | Near United States lock,
Congaree River, S. C. | Detroit, Mich..... | Salem, Ohio..... | Morehead City, N. C..... | Do. |
| 3. When built..... | 1915..... | 1916..... | 1913..... | 1916..... | 1901..... |
| 4. Builder..... | U. S. Engineer Department
(hired labor). | U. S. Lake Survey Office..... | W. H. Mullins Co..... | John F. Bell Co. (inc.)..... | U. S. E. D. |
| 5. Time to build..... | No record. | 2 months..... | Salem, Ohio..... | 9 months..... | |
| 6. Where purchased..... | No record. | Detroit, Mich..... | Salem, Ohio..... | | |
| 7. When purchased..... | May, 1916..... | May, 1916..... | 1913..... | | |
| 8. From whom purchased..... | U. S. Lake Survey Office..... | U. S. Lake Survey Office..... | W. H. Mullins Co..... | | |
| 9. Purchase price..... | \$207.28..... | \$207.28..... | \$1,256..... | \$13,450..... | \$10,000. |
| 10. Contract cost..... | do..... | \$207.28..... | \$1,256..... | | |
| 11. Complete cost with outfit..... | | | | | |
| 12. Present value..... | \$125..... | \$200..... | \$746..... | \$12,000..... | \$6,000. |
| 13. Hull: | Wood..... | Wood..... | Steel..... | Wood..... | Wood. |
| (a) Material of hull..... | 16 feet..... | 16 feet..... | 26 feet 4 inches..... | 60 feet..... | 56 feet. |
| (b) Length over all..... | 15 feet 7 inches..... | 15 feet 7 inches..... | 26 feet 5 inches..... | 50 feet..... | 50 feet. |
| (c) Length on water line..... | 4 feet..... | 5 feet..... | 6 feet 1 inch..... | 16 feet 6 inches..... | 12 feet 4 inches. |
| (d) Beam over all..... | 3 feet 6 inches..... | 4 feet 4 inches..... | 5 feet 5 inches..... | 12 feet..... | 12 feet. |
| (e) Beam on water line..... | 1 foot 2 inches..... | 2 feet 4 inches..... | 2 feet 6 inches..... | 7 feet..... | 5 feet. |
| (f) Depth of hull forward..... | 1 foot 2 inches..... | 2 feet 2 inches..... | 2 feet 3 inches..... | 5 feet 3 inches..... | 5 feet 9 inches. |
| (g) Depth of hull amidships..... | 9 inches..... | 1 foot 10 inches..... | 1 foot 5 inches..... | 5 feet 2 inches..... | 4 feet 6 inches. |
| (h) Depth of hull aft..... | 5 inches..... | 8 inches..... | 8 inches..... | 3 feet..... | 3 feet. |
| (i) Draught forward..... | 1 foot 6 inches..... | 1 foot..... | 2 feet 3 inches..... | 5 feet 9 inches..... | 5 feet 9 inches. |
| (j) Draught amidships..... | 2 feet..... | 8 inches..... | 2 feet..... | 5 feet 9 inches..... | 5 feet 6 inches. |
| (k) Draught to bottom of propeller..... | 4 inches..... | 2 inches..... | 2 feet 2 inches..... | | 3 inches. |
| (l) Depth of keel from bottom of outside of planking..... | 0.60..... | 2½..... | 14..... | 42 tons..... | 35 tons. |
| (m) Displacement (long tons)..... | 8..... | 6½..... | 15..... | 10..... | 9. |
| (n) Speed in statute miles per hour..... | None..... | | | 23 feet 3 inches..... | After house, 6 feet; forward house, 5 feet 3 inches. |
| 14. Houses: | | | | | |
| (a) Length..... | | | | | |

| (c) Height above deck. | (d) Accommodations | (e) Weight above deck. | (f) Height of mast. | (g) Mast diameter at base. | (h) Mast diameter at top. | (i) Mast height above deck. | (j) Mast diameter at base. |
|---|-------------------------------------|------------------------|------------------------|----------------------------|---------------------------|-----------------------------|----------------------------|
| 15. Motors: | | | | | | | |
| (a) Number. | Seats 4 men. | 6 feet 7 inches. | 4 man. | 10 inches. | 8 man. | 10 inches. | 8 man. |
| (b) Type. | 1-cylinder, heavy duty. | 1913. | Corliss Gas Engine Co. | 10 inches. | 12 inches. | 12 inches. | 12 inches. |
| (c) When built. | Not known. | 1913. | Leow-Victor. | 10 inches. | 12 inches. | 12 inches. | 12 inches. |
| (d) Make. | Buffalo Motor Works. | 1913. | Leow-Victor. | 10 inches. | 12 inches. | 12 inches. | 12 inches. |
| (e) Number of cylinders (one engine). | 2. | 2. | 2. | 2. | 2. | 2. | 2. |
| (f) Diameter of cylinder. | 41 inches. | 41 inches. | 41 inches. | 41 inches. | 41 inches. | 41 inches. | 41 inches. |
| (g) Stroke. | 41 inches. | 41 inches. | 41 inches. | 41 inches. | 41 inches. | 41 inches. | 41 inches. |
| (h) Revolutions per minute. | 300. | 300. | 300. | 300. | 300. | 300. | 300. |
| (i) Rated brake horsepower (G.P.A.). | 53. | 53. | 53. | 53. | 53. | 53. | 53. |
| (j) Weight of one motor. | 205 pounds. | 205 pounds. | 205 pounds. | 205 pounds. | 205 pounds. | 205 pounds. | 205 pounds. |
| 16. Propellers: | | | | | | | |
| (a) Number of blades. | 3. | 3. | 3. | 3. | 3. | 3. | 3. |
| (b) Diameter. | 15 inches. | 15 inches. | 15 inches. | 15 inches. | 15 inches. | 15 inches. | 15 inches. |
| (c) Pitch. | 24 inches. | 24 inches. | 24 inches. | 24 inches. | 24 inches. | 24 inches. | 24 inches. |
| (d) Diameter of shaft. | 1 inch. | 1 inch. | 1 inch. | 1 inch. | 1 inch. | 1 inch. | 1 inch. |
| 17. Heating system: | | | | | | | |
| (a) Type. | None. | None. | None. | None. | None. | None. | None. |
| (b) Size of heater. | do. | do. | do. | do. | do. | do. | do. |
| (c) Number of radiators. | do. | do. | do. | do. | do. | do. | do. |
| 18. Electric-light plant: | | | | | | | |
| (a) Make. | None. | None. | None. | None. | None. | None. | None. |
| (b) Type of motor. | do. | do. | do. | do. | do. | do. | do. |
| (c) Brake horsepower. | do. | do. | do. | do. | do. | do. | do. |
| (d) Revolutions per minute. | do. | do. | do. | do. | do. | do. | do. |
| (e) Capacity of generator in kilowatts. | do. | do. | do. | do. | do. | do. | do. |
| (f) Number of lights. | do. | do. | do. | do. | do. | do. | do. |
| (g) Average candlepower per light. | do. | do. | do. | do. | do. | do. | do. |
| (h) Diameter of searchlight. | do. | do. | do. | do. | do. | do. | do. |
| 19. Number of men in crew. | No regular crew; operated by 1 man. | 1. | 1. | 1. | 1. | 1. | 1. |

TABLE XVII.—Report of operations of gasoline launches (scow) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Grandy. | Hancock No. 2. | Harpeth. | Harriett, E. M. | Helena. |
|--|--|--|---|-----------------------------------|-----------------------------------|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | | | \$144.75 | \$2,373.90 | \$2,023.75 |
| 21. Subsistence..... | | | 6.88 | 560.73 | 256.92 |
| 22. Fuel..... | \$15.06 | \$3.00 | 89.81 | 2,105.80 | 1,408.58 |
| 23. Supplies (machinery)..... | 10.38 | 1.50 | 24.43 | 113.40 | 1,227.34 |
| 24. Repairs: | | | | | |
| (a) Hull..... | | | 91.57 | 766.58 | 314.33 |
| (b) Machinery..... | 37.56 | 2.60 | | 613.74 | 287.07 |
| 25. Additions and alterations..... | | | | 880.38 | 226.19 |
| 26. Miscellaneous..... | 16.30 | | 11.72 | 241.54 | 74.09 |
| 27. Total..... | \$30.30 | \$7.10 | \$396.16 | \$7,700.95 | \$5,513.27 |
| 28. Approximate number of miles run during year..... | 650..... | 50..... | 844..... | | |
| 29. Number of days in commission..... | 396..... | 11..... | 19..... | | |
| 30. Cost of fuel per gallon..... | 24 cents per gallon..... | 20 cents..... | 23 cents..... | | |
| | <i>Remarks.</i>
Used on inspection trips and for conveying supplies and mail to dredge and snag-boat on Congaree River, S. C. | <i>Remarks.</i>
Carried on U. S. steamer Hancock and used as a life-boat and tender.
Material and labor furnished by U. S. Lake Survey Office and paid for by U. S. Engineer Office, Grand Rapids. | <i>Remarks.</i>
Used at Lock C, Cumberland River, for inspection service, etc. | <i>Remarks.</i>
Dredge tender. | <i>Remarks.</i>
Dredge tender. |

| Name..... | Horn. | Hiscutla. | Hinda. | Hill. | Hurricane. |
|---|--------------------|-----------------------------|---|-------------------|-------------------|
| 1. District..... | Milwaukee, Wis. | Rock Island. | Wilmington, Del. | Galveston, Tex. | Kansas City, Mo. |
| 2. Where built..... | Manitowoc, Wis. | St. Paul, Minn. | Morris Heights, N. Y. | Alta Loma, Tex. | Gasconade, Mo. |
| 3. When built..... | 1908. | 1912. | 1907. | Dan Plazier. | 1915. |
| 4. Builder..... | H. B. Burger. | Jos. Dingle Boat Works. | Gas Engine & Power Co. and Charles L. Seabury & Co. (Consolidated). | | United States. |
| 5. Time to build..... | 3 months. | 2 months. | | | 40 days. |
| 6. Where purchased..... | | St. Paul, Minn. | Morris Heights, N. Y. | | |
| 7. When purchased..... | | 1912. | November, 1907. | | |
| 8. From whom purchased..... | | Jos. Dingle Boat Works. | | | |
| 9. Purchase price..... | \$1,540. | \$1,516.75. | \$2,000. | \$2,000. | \$290.10. |
| 10. Contract price..... | \$1,482.50. | \$1,482.50. | \$2,600. | | \$232.35. |
| 11. Complete cost with outfit..... | \$1,540. | \$1,516.75. | | | \$225. |
| 12. Present value..... | \$850. | \$669.31. | \$1,500. | \$750. | |
| 13. Hull: | | | | | |
| (a) Material of hull..... | Wood. | Wood. | Wood. | Wood. | Wood. |
| (b) Length over all..... | 36 feet. | 35 feet 2 inches. | 28 feet. | 31 feet 5 inches. | 24 feet 2 inches. |
| (c) Length on water line..... | 32 feet 6 inches. | 34 feet 11 inches. | 23 feet 2 inches. | 30 feet 5 inches. | 23 feet 7 inches. |
| (d) Beam over all..... | 9 feet 6 inches. | 6 feet 2½ inches. | 7 feet 6 inches. | 8 feet 5 inches. | 5 feet 4 inches. |
| (e) Beam on water line..... | 8 feet 10 inches. | 5 feet 7½ inches. | About 7 feet. | 7 feet 11 inches. | 4 feet 6 inches. |
| (f) Depth of hull forward..... | 5 feet 1 inch. | 3 feet 6 inches. | 5 feet 3 inches. | 4 feet. | 2 feet 7 inches. |
| (g) Depth of hull amidships..... | 4 feet 5 inches. | 3 feet 1½ inches. | 4 feet 3½ inches. | 3 feet 6 inches. | 1 foot 10 inches. |
| (h) Depth of hull aft..... | 4 feet 10½ inches. | 2 feet 2½ inches. | 4 feet. | 3 feet. | 1 foot 10 inches. |
| (i) Draft forward..... | 1 foot 6 inches. | 10½ inches. | 1 foot 10 inches. | 1 foot 7 inches. | 4 inches. |
| (j) Draft at..... | 3 feet 6 inches. | 2½ inches. | 2 feet 5 inches. | 3 feet 2 inches. | 4 inches. |
| (k) Draft to bottom of propeller..... | 3 feet 2 inches. | 2 feet 1 inch. | 2 feet 4 inches. | 3 feet. | 1 foot 8 inches. |
| (l) Depth of keel from bottom of outside plank-ing..... | 5 inches. | No keel. | From 0 to 1 foot. | 3 inches. | No keel. |
| (m) Displacement (long tons)..... | 11. | 1½. | 1.8. | 7. | 1½. |
| (n) Speed in statute miles per hour..... | 8½. | 14. | About 9. | 8½. | 11. |
| 14. House: | | | | | |
| (a) Length..... | 12 feet 4 inches. | None (Kanyon top). | 8 feet. | 11 feet. | None. |
| (b) Width..... | 8 feet 3 inches. | | 7 feet 3 inches. | 6 feet. | |
| (c) Height above deck..... | 3 feet 9 inches. | | 3 feet 1 inch. | 3 feet 9 inches. | |
| (d) Accommodations..... | None. | Seating capacity for eight. | 2 passengers. | None. | |

TABLE XVII.—*Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Heron. | Hiasantha. | Hinda. | Hill. | Hurricane. |
|---|--------------------------|--|--|---------------|-----------------|
| 15. Motors: | | | | | |
| (a) Number..... | 1. | 1. | 1. | 1. | 1. |
| (b) Type..... | Make and break; 2-cycle. | 4-cycle. | 4-cycle. | 4-cycle. | 2 cycle marine. |
| (c) When built..... | 1908. | 1912. | 1916. | 1914. | Gray. |
| (d) Make..... | Kahtenberg. | "Capitol," by Auto Engine Works, St. Paul. | Feeries Marine Motor Co., Buffalo, N. Y. | Clifton. | 2. |
| (e) Number of cylinders (one engine). | 2. | 4. | 4. | 3. | 2. |
| (f) Diameter of cylinder. | 6½ inches. | 5½ inches. | 5 inches. | 6½ inches. | 5½ inches. |
| (g) Stroke..... | 7 inches. | 6 inches. | 6 inches. | 7 inches. | 5 inches. |
| (h) Revolutions per minute. | 325. | 900. | 600. | 350-400. | 650. |
| (i) Rated brake horsepower (total). | 16. | 35. | 25-35. | 21. | 20. |
| (j) Weight of one motor. | 1,600 pounds. | 675 pounds. | 725 pounds. | 1,900 pounds. | 600 pounds. |
| 16. Propeller: | | | | | |
| (a) Number of blades. | 3. | 3. | 3. | 3. | 3. |
| (b) Diameter..... | 30 inches. | 19 inches. | 22 inches. | 23 inches. | 20 inches. |
| (c) Pitch..... | 36 inches. | 23 inches. | 26 inches. | 32 inches. | 25 inches. |
| (d) Diameter of shaft. | 2 inches. | 1½ inches. | 1½ inches. | 1½ inches. | 1½ inches. |
| 17. Heating system: | | | | | |
| (a) Type..... | None. | None. | None. | None. | None. |
| (b) Size of heater..... | | | | | |
| (c) Number of radiators. | | | | | |
| 18. Electric-light plant: | | | | | |
| (a) Make..... | None. | None. | None. | None. | None. |
| (b) Type of motor..... | | | | | |
| (c) Brake horsepower. | | | | | |
| (d) Revolutions per minute. | | | | | |
| (e) Capacity of generator in kilowatts. | | | | | |
| (f) Number of lights. | | | | | |
| (g) Average of lights per hour. | | | | | |
| (h) Average of lights per flight. | | | | | |

4559

18751—ENG 1917—288

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Hydrog. | Ingalls, Gen. | Ins. | Inspector. | Inspector. |
|---|---|---------------------------|------------------------|---|-------------------------------|
| 1. District..... | St. Louis, Mo., Mississippi River Commission. | Second, New York..... | Dallas, Tex..... | Cleveland, Ohio..... | Detroit, Mich. (Lake Survey). |
| 2. Where built..... | St. Louis, Mo..... | Jersey City, N. J..... | Liberty, Tex..... | Detroit, Mich..... | Rachue, Wis. |
| 3. When built..... | 1911..... | 1896..... | October, 1909..... | 1901..... | 1903..... |
| 4. Builder..... | G. C. Marsh..... | Alco-Vapor Launch Co..... | United States..... | P. H. Studer..... | Rachue Boat Manufacturing Co. |
| 5. Time to build..... | 2 months..... | Not known..... | 1 month..... | Unknown..... | Rachue, Wis. |
| 6. Where purchased..... | St. Louis, Mo..... | Jersey City, N. J..... | Not known..... | Detroit, Mich..... | 1903..... |
| 7. When purchased..... | October, 1911..... | 1896..... | October, 1911..... | 1901..... | Rachue Boat Manufacturing Co. |
| 8. From whom purchased..... | G. C. Marsh..... | Builders..... | Builders..... | Detroit Motor Works..... | \$5,000. |
| 9. Purchase price..... | \$350.30..... | \$4,500..... | ..... | \$1,375..... | |
| 10. Contract cost..... | \$369.59..... | ..... | \$339.73..... | Unknown..... | |
| 11. Complete cost with outfit..... | ..... | ..... | ..... | \$1,375..... | |
| 12. Present value..... | \$150..... | \$3,500..... | \$600..... | \$400..... | \$1,400..... |
| 13. Hull: | | | | | |
| (a) Material of hull..... | Wood..... | Wood..... | Wood, red cypress..... | Wood..... | Steel. |
| (b) Length over all..... | 24 feet 10 inches..... | 43 feet..... | 27 feet 10 inches..... | 32 feet 2 inches..... | 50 feet 3 inches. |
| (c) Length on water line..... | 24 feet 4 inches..... | 39 feet..... | 26 feet..... | 21 feet..... | 46 feet 4 inches. |
| (d) Beam over all..... | 5 feet 7 inches..... | 8 feet 11 inches..... | 8 feet 4 inches..... | 6 feet 6 inches outside of fenders..... | 8 feet 9 inches. |
| (e) Beam on water line..... | 5 feet..... | 7 feet 9 inches..... | 7 feet 4 inches..... | 6 feet 6 inches..... | 8 feet. |
| (f) Depth of hull forward..... | 3 feet 1 inch..... | 4 feet 9 inches..... | 4 feet..... | 4 feet 7 inches from bottom of keel to top of deck..... | 5 feet. |
| (g) Depth of hull amidships..... | 1 foot 7 inches..... | ..... | 3 feet..... | 4 feet 2 inches from bottom of keel to top of deck..... | 4 feet 8 inches. |
| (h) Depth of hull aft..... | 1 foot 10 inches..... | 4 feet..... | 3 feet..... | 4 feet 7 inches from bottom of keel to top of deck..... | 5 feet 3 inches. |
| (i) Draft forward..... | 10 inches..... | 1 foot 8 inches..... | 6 inches..... | 8 inches..... | 1 foot 3 inches. |
| (j) Draft aft..... | 1 foot..... | 3 feet..... | 3 inches..... | 3 feet..... | 3 feet 3 inches. |
| (k) Draft to bottom of propeller..... | 1 foot 9 inches..... | 2 feet 10 inches..... | 1 foot 3 inches..... | 2 feet 8 inches (approximately)..... | 3 feet. |
| (l) Depth of keel from bottom of outside of planking..... | ..... | 24 inches..... | 4 inch..... | 1 foot 6 inches (approximately)..... | 4 inches. |
| (m) Displacement (long tons)..... | 1.83..... | About 8..... | 2..... | 6..... | 28. |
| (n) Speed in statute miles per hour..... | About 6..... | 9.3 (statute)..... | 7..... | 8..... | 9½ to 10. |

| | | | | | | | |
|----------------------------|---|--------------------------------------|--------------------------|---------------------|---------------------------|---------------|------------------|
| 14. Horse: | (a) Length..... | 37 feet 6 inches. | 5 feet 9 inches. | 1 | None. | 1 | 26 feet. |
| | (b) Width..... | 7 feet 3 inches. | 6 feet 3 inches. | 2-cycle. | do. | 1-cycle. | 7 feet 7 inches. |
| | (c) Height above deck. | 3 feet 4 inches and 4 feet 3 inches. | 3 feet 4 inches. | 1912. | do. | 1914. | 4 feet 3 inches. |
| | (d) Accommodations..... | No sleeping or mess room. | 2 seats length of cabin. | Van Blerk Motor Co. | do. | Pay & Bowen. | |
| 15. Motors: | (a) Number..... | 1 | 1 | 2. | 1 | 4. | |
| | (b) Type..... | 4-cycle. | 2-cycle. | 1912. | 1-cycle gas. | 1-cycle. | |
| | (c) When built..... | September, 1911. | 1912. | 2. | Buffalo Motor Co. | 1914. | |
| | (d) Make..... | Eagle Co., Newark, N. J. | Van Blerk Motor Co. | 2. | Vermaat & Monahan. | Pay & Bowen. | |
| | (e) Number of cylinders (1 engine). | 2. | 2. | 2. | 2. | 4. | |
| | (f) Diameter of cylinder. | 4½ inches. | 4½ inches. | 4½ inches. | 3½ inches. | 5½ inches. | |
| | (g) Strokes..... | 5 inches. | 5 inches. | 5 inches. | 5 inches. | 7 inches. | |
| | (h) Revolutions per minute. | 700. | 540 (average). | 200 to 650. | 600 maximum, 120 minimum. | 550. | |
| | (i) Rated brake horsepower. | 12. | 20. | 12. | 10. | 35. | |
| | (j) Weight of 1 motor. | 500 pounds. | 710 pounds. | 480 pounds. | 550 pounds. | 2,100 pounds. | |
| 16. Propeller: | (a) Number of blades..... | 3. | 3. | 3. | 3. | 3. | |
| | (b) Diameter..... | 18 inches. | 24 inches. | 20 inches. | 20 inches. | 38 inches. | |
| | (c) Pitch..... | 24 inches. | 28 inches. | 24 inches. | 22 inches. | 30 inches. | |
| | (d) Diameter of shaft..... | 1 inch. | 2 inches. | 1½ inches. | 1½ inches. | 2 inches. | |
| 17. Heating system: | (a) Type..... | None. | None. | None. | None. | None. | |
| | (b) Size of heater..... | None. | None. | None. | None. | None. | |
| | (c) Number of radiators..... | None. | None. | None. | None. | None. | |
| 18. Electric-light plant: | (a) Make..... | None. | None. | None. | None. | None. | |
| | (b) Type of motor..... | None. | None. | None. | None. | None. | |
| | (c) Brake horsepower..... | None. | None. | None. | None. | None. | |
| | (d) Revolutions per minute..... | None. | None. | None. | None. | None. | |
| | (e) Capacity of generator in kilowatts..... | None. | None. | None. | None. | None. | |
| | (f) Number of lights..... | None. | None. | None. | None. | None. | |
| | (g) Average candle-power per light..... | None. | None. | None. | None. | None. | |
| | (h) Diameter of searchlight..... | None. | None. | None. | None. | None. | |
| 19. Number of men in crew: | (a) Number of men in crew..... | 3. | 3. | 3. | 3. | 3. | |
| | (b) Operated by one of crew..... | 1. | 1. | 1. | 1. | 1. | |

TABLE XVII. — *Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Hydro. | Ingalls, Gen. | Ino. | Inspector. | Inspector. |
|---|---|-----------------------|--------------------|---|-------------------------------|
| 1. District..... | St. Louis, Mo., Mississippi River Commission. | Second, New York. | Dallas, Tex. | Cleveland, Ohio. | Detroit, Mich. (Lake Survey). |
| 2. Where built..... | St. Louis, Mo. | Jersey City, N. J. | Liberty, Tex. | Detroit, Mich. | Racine, Wis. |
| 3. When built..... | 1911. | 1898. | October, 1909. | P. H. Studer. | 1903. |
| 4. Builder..... | G. C. Marsh. | Alco-Vapor Launch Co. | United States. | Unknown. | Racine Boat Manufacturing Co. |
| 5. Time to build..... | 2 months. | Not known. | 1 month. | Unknown. | Racine, Wis. |
| 6. Where purchased..... | St. Louis, Mo. | Jersey City, N. J. | | Detroit, Mich. | 1903. |
| 7. When purchased..... | October, 1911. | 1898. | | Detroit Motor Works. | Racine Boat Manufacturing Co. |
| 8. From whom purchased..... | G. C. Marsh. | Builders. | | Unknown. | \$5,000. |
| 9. Purchase price..... | \$350.30. | \$4,500. | | \$1,375. | |
| 10. Contract cost..... | \$369.89. | | \$539.73. | \$1,375. | |
| 11. Complete cost with outfit..... | \$190. | \$3,500. | \$800. | \$400. | \$1,400. |
| 12. Present value..... | Wood. | Wood. | Wood, red cypress. | Wood. | Steel. |
| 13. Hull: | (a) Material of hull..... | 24 feet 10 inches. | 27 feet 10 inches. | 22 feet 2 inches. | 50 feet 3 inches. |
| (b) Length over all..... | 43 feet. | 39 feet. | 26 feet. | 21 feet. | 46 feet 4 inches. |
| (c) Length on water line..... | 24 feet 4 inches. | | | | |
| (d) Beam over all..... | 5 feet 7 inches. | 8 feet 11 inches. | 8 feet 4 inches. | 6 feet 6 inches outside of fenders. | 8 feet 9 inches. |
| (e) Beam on water line..... | 5 feet. | 7 feet 9 inches. | 7 feet 4 inches. | 6 feet 6 inches. | 8 feet. |
| (f) Depth of hull forward..... | 3 feet 1 inch. | 4 feet 9 inches. | 4 feet. | 4 feet 7 inches from bottom of keel to top of deck. | 5 feet. |
| (g) Depth of hull amidships..... | 1 foot 7 inches. | | 3 feet. | 4 feet 2 inches from bottom of keel to top of deck. | 4 feet 8 inches. |
| (h) Depth of hull aft..... | 1 foot 10 inches. | 4 feet. | 3 feet. | 4 feet 7 inches from bottom of keel to top of deck. | 5 feet 2 inches. |
| (i) Draft forward..... | 10 inches. | 1 foot 8 inches. | 6 inches. | 8 inches. | 1 foot 3 inches. |
| (j) Draft aft..... | 1 foot. | 3 feet. | 3 inches. | 3 feet. | 3 feet 3 inches. |
| (k) Draft to bottom of propeller..... | 1 foot 9 inches. | 2 feet 10 inches. | 1 foot 3 inches. | 2 feet 8 inches (approximately). | 3 feet. |
| (l) Depth of keel from bottom of outside of planking..... | 24 inches. | 24 inches. | 4 inch. | 1 foot 6 inches (approximately). | 4 inches. |
| (m) Displacement (long tons). | 1.53. | About 8. | 2. | 6. | 26. |
| (n) Speed in statute miles per hour..... | About 8. | 9.3 (statute). | 7. | 8. | 9 1/2 to 10. |

| | | | | |
|----------------------------|--|--|--|--|
| 14. House: | 27 feet 6 inches.
(a) Length.
7 feet 3 inches.
(b) Width.
3 feet 4 inches and 4 feet 3 inches.
(c) Height above deck.
(d) Accommodations | 8 feet 9 inches.
6 feet 3 inches.
3 feet 4 inches.
2 seats length of cabin. | N one.
do.
do.
do. | 30 feet.
7 feet 7 inches.
4 feet 3 inches. |
| 15. Motors: | (a) Number.
(b) Type.
(c) When built.
(d) Make.
(e) Number of cylinders (1 engine). | 1.
2-cycle.
September, 1911.
Eagle Co., Newark, N. J.
2. | 1.
2-cycle.
1909.
Termaat & Monahan.
2. | 1.
4-cycle gas.
1904.
Buffalo Motor Co.
4. |
| | (f) Diameter of cylinder.
(g) Stroke.
(h) Revolutions per minute.
(i) Rated brake horsepower (total).
(j) Weight of 1 motor. | 44 inches.
5 inches.
700.
12.
500 pounds. | 44 inches.
do.
200 to 650.
12.
490 pounds. | 53 inches.
7 inches.
600 maximum, 120 minimum 550.
35.
2,100 pounds. |
| 16. Propeller: | (a) Number of blades.
(b) Diameter.
(c) Pitch.
(d) Diameter of shaft 1 inch. | 3.
18 inches.
24 inches.
1 inch. | 3.
20 inches.
24 inches.
14 inches. | 3.
33 inches.
30 inches.
2 inches. |
| 17. Heating system: | (a) Type.
(b) Size of heater.
(c) Number of radiators. | N one.
N one. | N one.
N one. | |
| 18. Electric-light plant: | (a) Make.
(b) Type of motor.
(c) Brake horsepower.
(d) Revolutions per minute.
(e) Capacity of generator in kilowatts. | N one.
N one. | N one.
N one. | |
| | (f) Number of lights.
(g) Average candle-power per light.
(h) Diameter of searchlight. | | | |
| 19. Number of men in crew: | 1. | 3. | Operated by one of crew. | 2. |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Hydro. | Legalle, Gen. | Ino. | Inspector. | Inspector. |
|--|---------------------------|---|---|-------------------------|--|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | | \$2,880.00 | | \$1,074.00 | \$326.17 |
| 21. Subsistence..... | | | | | 294.10 |
| 22. Fuel..... | | 327.00 | \$127.87 | 110.30 | 44.58 |
| 23. Supplies (machinery)..... | | 61.53 | 28.86 | 2.25 | |
| 24. Repairs..... | | | | | |
| (6) Hull..... | | 203.98 | | 10.10 | 161.94 |
| (6) Machinery..... | | 32.44 | 25.75 | 20.16 | 150.56 |
| 25. Additions and alterations..... | | 16.75 | | | |
| 26. Miscellaneous..... | | 65.00 | | 25.32 | 156.68 |
| 27. Total..... | | \$3,786.70 | | \$1,242.13 | \$1,134.03 |
| 28. Approximate number of miles run during year..... | | | 1,338 | 2,090 | 180. |
| 29. Number of days in commission..... | | | 268 | 209 | 23.1 cents. |
| 30. Cost of fuel per gallon..... | | Average, 25 cents + | 17 cents. | 20 to 24 cents. | |
| | Remarks. | Remarks. | Remarks. | Remarks. | Remarks. |
| | Not used during the year. | Operated on Gowanus Bay Channels, Gowanus Creek improvement and collection of drift in New York Harbor, N. Y. | On lower Trinity River in connection with U. S. snagboat Trinity. | Cleveland Harbor, Ohio. | On hydrographic surveys, New York State. |

| Name..... | Inspector No. 1. | Jefferson. | Jennie. | Jordan. | Juanda. |
|---|---------------------|-----------------------|-----------------------|-------------------|------------------|
| 1. District..... | Little Rock, Ark. | Dallas, Tex. | First, Portland, Ore. | Mobile, Ala. | Dallas, Tex. |
| 2. Where built..... | Grafton, Ill. | Fort Arthur, Tex. | Portland, Ore. | Pascagoula, Miss. | Fulton, Ark. |
| 3. When built..... | 1908. | 1913. | 1907. | 1906. | 1910. |
| 4. Builder..... | Ripley Hardware Co. | United States. | O. P. Grahm. | Arthur Allen. | Arthur Allen. |
| 5. Time to build..... | Not known. | 2 months. | 2 months. | 2 months. | United States. |
| 6. Where purchased..... | Grafton, Ill. | Portland, Ore. | Portland, Ore. | Pascagoula, Miss. | 1 month. |
| 7. When purchased..... | 1908. | 1907. | 1907. | 1909. | |
| 8. From whom purchased..... | Ripley Hardware Co. | O. P. Grahm. | O. P. Grahm. | Arthur Allen. | |
| 9. Purchase price..... | \$750. | \$1,550. | \$1,550. | \$600. | |
| 10. Contract cost..... | Purchased. | | do. | \$600. | \$315.05. |
| 11. Complete cost with outfit..... | \$750. | \$1,121.45. | do. | \$600. | |
| 12. Present value..... | \$751. | \$700. | \$700. | \$250. | |
| 13. Hull: | | | | | |
| (a) Material of hull..... | Galvanized steel. | Wood. | Wood, Oregon fir. | Wood. | Wood. |
| (b) Length over all..... | 25 feet. | 30 feet 7 inches. | 30 feet. | 32 feet 4 inches. | 32 feet. |
| (c) Length on water line..... | 25 feet. | 28 feet. | 27 feet. | 29 feet 9 inches. | 25 feet. |
| (d) Beam over all..... | 4 feet 6 inches. | 7 feet. | 8 feet. | 9 feet 8 inches. | 6 feet 3 inches. |
| (e) Beam on water line..... | 4 feet 2 inches. | 5 feet. | 7 feet. | 9 feet. | 5 feet 1 inch. |
| (f) Depth of hull forward..... | 3 feet 5 inches. | 5 feet 6 inches. | 4 feet. | 2 feet 7 inches. | 3 feet 1 inch. |
| (g) Depth of hull amidships..... | 2 feet 6 inches. | 4 feet. | 3 feet 3 inches. | 3 feet 2 inches. | 2 feet 4 inches. |
| (h) Depth of hull aft..... | 2 feet. | 4 feet 11 inches. | 3 feet 9 inches. | 2 feet 7 inches. | 2 feet 2 inches. |
| (i) Draft forward..... | 1 foot. | 1 foot. | 1 foot 6 inches. | 2 feet. | 1 foot. |
| (j) Draft aft..... | 4 inches. | 2 feet 2 inches. | 2 feet 4 inches. | 2 feet 8 inches. | 4 feet. |
| (k) Draft to bottom of propeller..... | 2 feet 2 inches. | 2 feet. | 2 feet 2 inches. | 2 feet 4 inches. | 1 foot. |
| (l) Depth of keel from bottom of outside of planking..... | | 4 inches. | 3 inches. | 2 inches. | No keel. |
| (m) Displacement (long tons)..... | 3. | 2. | 5. | 8.5. | |
| (n) Speed in statute miles per hour..... | 8. | 8. | 8. | 7. | 4. |
| 14. House: | | | | | |
| (a) Length..... | None. | 15 feet 5 inches. | 15 feet. | 20 feet 6 inches. | |
| (b) Width..... | | 5 feet 2 inches. | 6 feet. | 8 feet 7 inches. | |
| (c) Height above deck..... | | 3 feet. | 4 feet. | 3 feet 11 inches. | |
| (d) Accommodations..... | | 8 (seating capacity). | Seats only. | None. | |

TABLE XVII.—*Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Inspector No. 1. | Jefferson. | Jensen. | Jordan. | Juanita. |
|---|------------------|----------------|-------------------------------|---------------------|----------------|
| 15. Motors: | | | | | |
| (a) Number..... | 1..... | 1..... | 1..... | 1..... | 1..... |
| (b) Type..... | 2-cycle..... | 2-cycle..... | 2-cycle, heavy duty..... | 2-cycle marine..... | 2-cycle..... |
| (c) When built..... | 1908..... | 1915..... | 1907..... | 1910..... | 1912..... |
| (d) Make..... | Ferro..... | Lamb..... | Standard (San Francisco)..... | Automatic..... | Buffalo..... |
| (e) Number of cylinders (one engine)..... | 3..... | 4..... | 2..... | 2..... | 2..... |
| (f) Diameter of cylinder..... | 4 inches..... | 5½ inches..... | 6 inches..... | 5½ inches..... | 4½ inches..... |
| (g) Strokes..... | 4½ inches..... | 6 inches..... | 5½ inches..... | 6 inches..... | 5 inches..... |
| (h) Revolutions per minute..... | 300..... | 400..... | 400..... | 400..... | 375..... |
| (i) Rated brake horsepower (local)..... | 17..... | 24..... | 10..... | 12..... | 7½..... |
| (j) Weight of one motor..... | 400 pounds..... | 1,250..... | 1,500 pounds..... | 500 pounds..... | 400..... |
| 16. Propeller: | | | | | |
| (a) Number of blades..... | 2..... | 3..... | 2..... | 2..... | 3..... |
| (b) Diameter..... | 18 inches..... | 24 inches..... | 24 inches..... | 20 inches..... | 20 inches..... |
| (c) Pitch..... | 27 inches..... | 28 inches..... | 30..... | 20 inches..... | 24 inches..... |
| (d) Diameter of shaft..... | 1 inch..... | 1½ inches..... | 1½ inches..... | 1½ inches..... | 1½ inches..... |
| 17. Heating system: | | | | | |
| (a) Type..... | None..... | None..... | None..... | None..... | None..... |
| (b) Size of heater..... | ..... | ..... | ..... | ..... | ..... |
| (c) Number of radiators..... | ..... | ..... | ..... | ..... | ..... |
| 18. Electric-light plant: | | | | | |
| (a) Make..... | None..... | None..... | None..... | None..... | None..... |
| (b) Type of motor..... | ..... | ..... | ..... | ..... | ..... |
| (c) Brake horsepower..... | ..... | ..... | ..... | ..... | ..... |
| (d) Revolutions per minute..... | ..... | ..... | ..... | ..... | ..... |
| (e) Capacity of generator in kilowatts..... | ..... | ..... | ..... | ..... | ..... |
| (f) Number of lights..... | ..... | ..... | ..... | ..... | ..... |
| (g) Average candlepower per light..... | ..... | ..... | ..... | ..... | ..... |
| (h) Diameter of searchlight..... | ..... | ..... | ..... | ..... | ..... |
| 19. Number of men in crew..... | 1..... | 1..... | (c)..... | (c)..... | (c)..... |

4565

Digitized by Google

TABLE XVII.—Report of operations of gasoline launches (crew) for the calendar year ending Dec. 31, 1916—Continued.

| Name. | Katharine. | Kingmaker. | Krey, John. | Lad. | Leseca. |
|---|----------------------------|--|--------------------------------------|------------------------------|--------------------|
| 1. District. | New London, Conn. | Milwaukee, Wis. | Wilmington, N. C. | Detroit, Mich. | Galveston, Tex. |
| 2. Where built. | South Norwalk, Conn. | Manitowoc, Wis. | Muskegon, Mich. | Sault Ste. Marie, Mich. | Do. |
| 3. When built. | May, 1909. | 1908. | 1912-13. | 1898; engine installed 1911. | 1916. |
| 4. Builder. | Oscar Anderson. | H. B. Burger. | Radine-Truscott-Sheell Lake Boat Co. | Government employees. | U. S. E. D. |
| 5. Time to build. | Not known. | 3 months. | 4 months. | | 3 months. |
| 6. Where purchased. | Darien, Conn. | | | | |
| 7. When purchased. | Aug. 7, 1909. | | | | |
| 8. From whom purchased. | W. D. Anderson. | | | | |
| 9. Purchase price. | \$775. | | | | |
| 10. Contract cost. | Unknown. | \$1,960. | \$2,525. | | \$1,687.91. |
| 11. Complete cost with outfit. | \$1,650. | \$1,960. | \$2,541.18. | | |
| 12. Present value. | | \$1,600. | \$1,800. | \$10. | \$1,600. |
| 13. Hull: | | | | | |
| (a) Material of hull. | Cedar plank and oak frame. | Wood. | Wood. | Wood. | Wood. |
| (b) Length over all. | 30 feet 6 inches. | 41 feet 1 inch. | 35 feet 5 inches. | 33 feet. | 26 feet. |
| (c) Length on water line. | 28 feet. | 36 feet 8 inches. | 32 feet 9 inches. | 21 feet 6 inches. | 30 feet 11 inches. |
| (d) Beam over all. | 7 feet 11 inches. | 11 feet outside of guards. | 8 feet. | 6 feet 6 inches. | 7 feet 4 inches. |
| (e) Beam on water line. | 6 feet 10 inches. | 9 feet 6 inches. | 7 feet. | 5 feet 6 inches. | 6 feet 1 inch. |
| (f) Depth of hull forward. | 4 feet 4 inches. | 4 feet 2 inches. | 5 feet. | 2 feet 3 inches. | 4 feet 8 inches. |
| (g) Depth of hull amidships. | 3 feet 11 inches. | 4 feet. | 5 feet. | 2 feet. | 3 feet 3 inches. |
| (h) Depth of hull aft. | 4 feet 8 inches. | 4 feet. | 4 feet 6 inches. | 2 feet 5 inches. | 2 feet. |
| (i) Draft forward. | 9 inches. | 2 feet 1 inch. | 1 foot 10 inches. | 10 inches. | 1 foot 10 inches. |
| (j) Draft aft. | 2 feet 9 inches. | 5 feet. | 2 feet 6 inches. | 2 feet. | 2 feet 7 inches. |
| (k) Draft to bottom of propeller. | 2 feet 7 inches. | 4 feet 9 inches. | 2 feet 9 inches. | 1 foot 10 inches. | 2 feet 5 inches. |
| (l) Depth of keel from bottom of outside of planking. | 5 inches. | 5 inches. | 1 foot. | 2 inches. | 2 feet. |
| (m) Displacement (long tons). | About 2.5. | 19. | 7. | | 4. |
| (n) Speed in statute miles per hour. | 8. | 10. | 10. | | |
| 14. House: | | | | | |
| (a) Length. | 12 feet. | 18 feet 6 inches. | 20 feet 3 inches. | | 8 feet 5 inches. |
| (b) Width. | 7 feet to 3.2 feet. | 6 feet 3 inches. | 7 feet. | | 5 feet 6 inches. |
| (c) Height above deck. | 3.6 feet. | Pilot house 7 feet, house aft 3 feet 9 inches. | 3 feet. | | 2 feet 4 inches. |
| (d) Accommodations. | | None. | 20 persons. | | None. |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Katherine. | Kingmaker. | Kry, John. | Lad. | Laroca. |
|--|---|---|---|--|---|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | | \$617.50 | \$945.67 | | \$525.00 |
| 21. Subsistence..... | | | 276.00 | | 77.00 |
| 22. Fuel..... | | 364.63 | 443.50 | | 355.55 |
| 23. Supplies (machinery)..... | | 49.55 | 99.67 | | 31.99 |
| 24. Repairs: | | | | | |
| (a) Hull..... | 267.51 | | 83.08 | | 17.91 |
| (b) Machinery..... | 11.50 | 185.49 | 118.99 | | 3.70 |
| 25. Additions and alterations..... | | | 32.80 | | 17.25 |
| 26. Miscellaneous..... | | 18.50 | 9.04 | | |
| 27. Total..... | \$279.01 | \$1,266.67 | \$2,028.75 | | \$1,029.40 |
| 28. Approximate number of miles run during year..... | | 2,950 | 20.45 | | |
| 29. Number of days in commission..... | | 243 | 366 | | |
| 30. Cost of fuel per gallon..... | | 17.5 cents. | 23 cents. | | |
| | <i>Remarks.</i>
Not in commission during the year. | <i>Remarks.</i>
Operated at Kanabha and Sturgeon Bay Canal. While attending pile driving and derrick pit and concrete plant used in repairing plant, rivets, etc. Used as a towboat for handling floating plant in harbor. | <i>Remarks.</i>
Operated on Cape Fear River above Wilmington, N. C. and attached to plant of Lock and Dam No. 2 at Bryans Landing, N. C. Used as inspecting and survey boat and for towing dock scows between Bryans Landing and Wilmington, N. C. | <i>Remarks.</i>
Not in commission. Engine shipped to Engineer School (E. D. 7907(2)). | <i>Remarks.</i>
Tender for Sam Houston. Placed in commission in May. |

| Name..... | Lease. | Lease, Colonel. | Lease. | Liberty. | Long, Jas. C. |
|--|--------------------------|--|---|-----------------------|------------------------|
| 1. District..... | Louisville, Ky..... | Washington, D. C..... | Mobile, Ala..... | Dallas, Tex..... | Rock Island, Ill..... |
| 2. Where built..... | Cincinnati, Ohio..... | Baltimore, Md..... | Morris Heights, N. Y..... | Liberty, Tex..... | La Crosse, Wis..... |
| 3. When built..... | 1922 (about)..... | Mar. 24 to May 16, 1913..... | 1907..... | 1913..... | 1900..... |
| 4. Builder..... | Not known..... | Nilsen Yacht Building Co..... | Gas Engine & Power Co.
and Chas. L. Seabury &
Co..... | United States..... | Geo. Winans..... |
| 5. Time to build..... | do..... | 47 days..... | Morris Heights, N. Y..... | 2 months..... | Not known..... |
| 6. Where purchased..... | Cincinnati, Ohio..... | Built under contract..... | 1907..... | Rock Island, Ill..... | 1908..... |
| 7. When purchased..... | 1913..... | Delivered in Washington,
D. C., May 16, 1913..... | Gas Engine & Power Co.
and Chas. L. Seabury &
Co..... | Chas. McHugh..... | |
| 8. From whom purchased..... | Clifton Motor Works..... | | | | |
| 9. Purchase price..... | \$1,000..... | \$2,100..... | \$2,350..... | | \$1,750..... |
| 10. Contract cost..... | \$1,000..... | \$2,307.37..... | | | \$1,750..... |
| 11. Complete cost with
outfit..... | | | \$900..... | \$1,105.94..... | \$1,433.00..... |
| 12. Present value..... | \$1,000..... | \$2,070..... | Wood, cypress..... | | Wood..... |
| 13. Hull: | | | | | 42 feet..... |
| (a) Material of hull..... | Steel..... | 14-inch Georgia pine..... | 32 feet..... | Wood, cypress..... | 25 feet 10 inches..... |
| (b) Length over all..... | 40 feet 9 inches..... | 33 feet..... | 28 feet 10 inches..... | 24 feet 6 inches..... | 38 feet 6 inches..... |
| (c) Length on water
line..... | | | 7 feet 6 inches..... | 7 feet..... | 10 feet 9 inches..... |
| (d) Beam over all..... | 6 feet 7 inches..... | 10 feet 6 inches..... | 6 feet 10 inches..... | 5 feet 6 inches..... | 8 feet 3 inches..... |
| (e) Beam on water
line..... | 6 feet 1 1/2 inches..... | 9 feet..... | 4 feet 4 inches..... | 2 feet 9 inches..... | 4 feet 4 inches..... |
| (f) Depth of hull
forward..... | 4 feet 2 inches..... | 5 feet 6 inches..... | 4 feet..... | 2 feet 8 inches..... | 3 feet 8 inches..... |
| (g) Depth of hull
amidships..... | 3 feet 2 inches..... | 4 feet 5 inches..... | 3 feet 2 inches..... | 2 feet..... | 3 feet 10 inches..... |
| (h) Depth of hull
aft..... | 2 feet 1 inch..... | 5 feet 3 inches..... | 2 feet 1 inch..... | 2 inches..... | 1 foot 5 inches..... |
| (i) Draft forward..... | 1 foot..... | 2 feet..... | 2 feet 9 inches..... | 2 inches..... | 2 feet 7 inches..... |
| (j) Draft aft..... | 3 feet..... | 3 feet..... | 2 feet 5 inches..... | 10 inches..... | 2 feet 4 inches..... |
| (k) Draft to bottom
of propeller..... | 1 foot 6 inches..... | 3 feet 5 inches..... | 4 inches..... | 3 inch..... | 3 inches..... |
| (l) Depth of keel
from bottom of
outside of
planting..... | 2 1/2 inches..... | 5 1/2 inches..... | | | |
| (m) Displacement
(long tons)..... | 6..... | 8.3..... | 4.5..... | | 12..... |
| (n) Speed in statute
miles per hour..... | 10 1/2..... | 9 to 10..... | 8..... | 5..... | 7 (in canal)..... |

TABLE XVII.—Report of operations of gasoline launches (crew) for the calendar year ending Dec. 31, 1916—Continued.

| Name | Laura. | Leach, Colonel. | Leaf. | Liberty. | Long, Jas. C. |
|--------------------------------------|---------------------|--|------------------|---------------------|------------------|
| 14. House: | | | | | |
| (a) Length | 23 feet 4 inches | 12 feet | None | Canopy top, 16 feet | 28 feet. |
| (b) Width | 5 feet 6 inches | 8 feet | | 5 feet 8 inches | 7 1/2 feet. |
| (c) Height above deck | 8 feet 1 inch | 3 feet 7 inches | | 4 feet | 5 feet 6 inches. |
| (d) Accommodations. | None | None | | Passengers, 12 | 2 (crew). |
| 15. Motors: | | | | | |
| (a) Number | 2 | 1 | 1 | 1 | 1 |
| (b) Type | 4-cycle | 4-cycle | 4-cycle marine | 4-cycle | 4-cycle, heavy |
| (c) When built | | | | | duty. |
| (d) Make | Clifton Motor Works | 1913
Grand Rapids Gas Engine
& Yacht Co. | 1907
Speedway | 1913
Buffalo | 1912
Buffalo |
| (e) Number of cylinders (one engine) | 3 | 3 | 4 | 4 | 4 |
| (f) Diameter of cylinder | 5 inches | 6 inches | 4 1/2 inches | 3 inches | 6 inches. |
| (g) Stroke | 6 inches | 7 inches | 5 inches | 5 inches | 7 1/2 inches. |
| (h) Revolutions per minute | 500 | 520 | 448 | | 360. |
| (i) Rated brake horsepower (total) | 30 | 21 to 30 | 14 | 10 | 24 |
| (j) Weight of one motor. | 915 pounds. | 1,740 pounds. | 580 pounds. | 800 pounds. | 2,200 pounds. |
| 16. Propeller: | | | | | |
| (a) Number of blades | 3 | 3 | 4 | 3 | 3 |
| (b) Diameter | 20 inches | 28 inches | 20 inches | 16 inches | 28 inches. |
| (c) Pitch | 24 inches | 32 inches | 33 1/2 inches | 20 inches | 30 1/2 inches. |
| (d) Diameter of shaft. | 1 1/2 inches | 1 1/2 inches | 1 1/2 inches | 1 1/2 inches | 2 inches. |
| 17. Heating system: | | | | | |
| (a) Type | None | None | None | | None. |
| (b) Size of heater | | | | | |
| (c) Number of radiators | | | | | |
| 18. Electric-light plant: | | | | | |
| (a) Make | Wardle & Finch | None | None | | None. |
| (b) Type of motor | 3 undertype dynamos | | | | |
| (c) Brake horsepower | 30 | | | | |
| (d) Revolutions per minute. | 900 | | | | |

TABLE XVII.—*Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Long Point. | Lookout. | Louise. | Ludington. | Luzon. |
|---|--------------------|-------------------------|-----------------------|---------------------|----------------------|
| 1. District..... | Norfolk, Va. | New York. | Charleston, S. C. | Grand Rapids, Mich. | Pittsburgh, Pa. |
| 2. Where built..... | Crittenden, Va. | Morris Heights, N. Y. | Mount Pleasant, S. C. | do. | New York, N. Y. |
| 3. When built..... | 1912. | 1866 | E. O. Hall, Jr. | 1909. | 1901. |
| 4. Builder..... | Joseph Edmonds. | Gas Engine & Power Co. | months. | Jesiot Boat Co. | American Motor Co. |
| 5. Time to build..... | Not known. | 2 months. | Charleston, S. C. | do. | New York, N. Y. |
| 6. Where purchased..... | Hampton, Va. | London, N. J. | 1903 | Grand Rapids, Mich. | 1901. |
| 7. When purchased..... | Jan. 26, 1914. | 1866 | E. O. Hall, Jr. | 1909. | American Motor Co. |
| 8. From whom purchased..... | Alex. Turlington. | John H. Dialogue & Son. | do. | Jesiot Boat Co. | do. |
| 9. Purchase price..... | \$650. | \$1,450. | \$3,600. | \$401. | \$4,600. |
| 10. Contract cost..... | \$625. | \$1,450. | \$3,500. | \$426.50. | |
| 11. Complete cost with outfit..... | \$650. | \$100. | \$2,000. | \$250. | \$570. |
| 12. Present value..... | Wood. | Wood. | Wood. | Wood | Wood and sheet iron. |
| 13. Hull: | 35 feet. | 30 feet. | 41 feet. | 22 feet 4 inches. | 53 feet. |
| (a) Material of hull..... | 35 feet 3 inches. | 27 feet. | 31 feet. | 21 feet. | 45 feet. |
| (b) Length over all..... | 9 feet 6 inches. | 6 feet 6 inches. | 11 feet. | 5 feet 3 inches. | 9 feet 4 inches. |
| (c) Length on water line..... | 8 feet 6 inches. | 6 feet. | 9 feet 4 inches. | 4 feet 4 inches. | 8 feet 8 inches. |
| (d) Beam over all..... | 4 feet 7 inches. | 4 feet 2 inches. | 5 feet 7 inches. | 2 feet 1 inch. | 5 feet 9 inches. |
| (e) Beam on water line..... | 4 feet. | 3 feet. | 4 feet 1 inch. | 2 feet 4 inches. | 4 feet 9 inches. |
| (f) Depth of hull forward..... | 4 feet 3 inches. | 3 feet 9 inches. | 4 feet 10 inches. | 2 feet 24 inches. | 5 feet 7 inches. |
| (g) Depth of hull aft..... | 1 foot 4 inches. | 1 foot 6 inches. | 1 foot 7 inches. | 11 inches. | 2 feet. |
| (h) Draught forward..... | 2 feet 7 inches. | 2 feet 10 inches. | 2 feet 9 inches. | 2 feet 2 inches. | 3 feet 6 inches. |
| (i) Draught at..... | 2 feet 3 inches. | 2 feet 4 inches. | 2 feet 5 inches. | 2 feet 1 inch. | 3 feet 7 inches. |
| (j) Draught to bottom of propeller..... | 6 inches. | 6 inches. | 3 inches. | 1 inch. | |
| (k) Depth of keel from bottom of outside of planking..... | 5. | 3. | 13. | 1.47 ¹ . | 12. |
| (m) Displacement (long tons)..... | 8. | 7. | 9. | 8. | 8. |
| (n) Speed in statute miles per hour..... | 22 feet 10 inches. | 6 feet 10 inches. | 14.8 feet. | | 34 feet 6 inches. |
| 14. House: | 8 feet 10 inches. | 9.4 feet. | 9.4 feet. | | 8 feet 6 inches. |
| (a) Length..... | 2.1 feet. | 2.1 feet. | 2.1 feet. | | 4 feet. |
| (b) Width..... | None. | 4. | 4. | | None; seats for 20. |
| (c) Height above water..... | | | | | |
| (d) Accommodations..... | | | | | |

| 13. Motors: | | One 6-horsepower naphtha motor. | | 1. | | 1. | |
|---|---------------|----------------------------------|---------------------------------|---------------|--------------------------|--------------------------|--------------------------|
| (a) Number | 1. | Seabury | 4-cycle. | 1. | 1. | 1. | 1. |
| (b) Type | 2-cycle. | 1886 | 1913 | 2. | 2-cycle. | 4-cycle. | 4-cycle. |
| (c) When built | Not known. | J. W. Lathrop Co., Mystic, Conn. | Standard Motor Construction Co. | 3. | 1909 | American Motor Co. | American Motor Co. |
| (d) Make | 2. | 3. | 3. | 4. | 2. | 4. | 4. |
| (e) Number of cylinders (one end). | 6 inches | 3 1/2 inches | 6 inches | 6 1/4 inches | 6 1/4 inches | 6 1/4 inches | 6 1/4 inches |
| (f) Diameter of cylinder. | 6 1/4 inches | 4 1/2 inches | 8 inches | 8 inches | 8 inches | 7 inches | 7 inches |
| (g) Stroke | 42 1/2 | 42 1/2 | 360 | 360 | 450 | 450 | 450 |
| (h) Revolutions per minute. | 14 | 14 | 24 | 24 | 6 | 6 | 6 |
| (i) Rated brake horsepower | 900 pounds. | 900 pounds. | 1,800 pounds. | 1,800 pounds. | 415 pounds. | 1,500 pounds. | 1,500 pounds. |
| (j) Weight of one motor. | 3. | 4. | 3. | 3. | 2. | 3. | 3. |
| 16. Propeller: | 24 inches. | 22 inches. | 30 inches. | 30 inches. | 19 inches. | 19 inches. | 19 inches. |
| (a) Number of blades | 30 inches. | 33 inches. | 36 inches. | 36 inches. | Approximately 27 inches. | Approximately 27 inches. | Approximately 27 inches. |
| (b) Diameter. | 1 1/2 inches. | 1 inch. | 1 1/2 inches. | 1 1/2 inches. | 1 1/2 inches. | 1 1/2 inches. | 1 1/2 inches. |
| (c) Pitch. | None. | None. | None. | None. | None. | None. | None. |
| (d) Diameter of shaft | None. | None. | None. | None. | None. | None. | None. |
| 17. Heating system: | None. | None. | None. | None. | None. | None. | None. |
| (a) Type. | None. | None. | None. | None. | None. | None. | None. |
| (b) Size of heater. | None. | None. | None. | None. | None. | None. | None. |
| (c) Number of radiators. | None. | None. | None. | None. | None. | None. | None. |
| 18. Electric-light plant: | None. | None. | None. | None. | None. | None. | None. |
| (a) Make. | None. | None. | None. | None. | None. | None. | None. |
| (b) Type of motor. | None. | None. | None. | None. | None. | None. | None. |
| (c) Brake horsepower | None. | None. | None. | None. | None. | None. | None. |
| (d) Revolutions per minute. | None. | None. | None. | None. | None. | None. | None. |
| (e) Capacity of generator in kilowatts. | None. | None. | None. | None. | None. | None. | None. |
| (f) Number of lights. | None. | None. | None. | None. | None. | None. | None. |
| (g) Average candlepower per light. | None. | None. | None. | None. | None. | None. | None. |
| (h) Diameter of searchlight. | None. | None. | None. | None. | None. | None. | None. |
| 19. Number of men in crew. | 2. | 1. | 1. | 1. | 1. | 1. | 1. |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name | Long Point. | Lookout. | Looker. | Ledington. | Leason. |
|--|--|--|--|--|--|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | \$396.00 | \$1,200.00 | \$780.00 | ..... | \$1,265.05 |
| 21. Subsistence..... | ..... | 182.81 | 45.30 | ..... | ..... |
| 22. Fuel..... | 226.30 | 200.50 | 991.41 | \$32.80 | 443.25 |
| 23. Supplies (machinery)..... | 24.00 | 10.80 | 38.29 | 7.10 | 19.70 |
| 24. Repairs: | | | | | |
| (a) Hull..... | 60.50 | 94.00 | 15.10 | 1.28 | 4.00 |
| (b) Machinery..... | 128.73 | ..... | 16.19 | ..... | 128.79 |
| 25. Additions and alterations..... | ..... | ..... | ..... | ..... | ..... |
| 26. Miscellaneous..... | 6.50 | ..... | 63.42 | ..... | 17.00 |
| 27. Total..... | \$831.03 | \$1,778.11 | \$1,549.70 | \$61.18 | \$1,873.79 |
| 28. Approximate number of miles run during year..... | 2,672..... | About 200 miles per week..... | 6,048..... | 650..... | 1,070..... |
| 29. Number of days in commission..... | 340..... | 211..... | 306..... | 180..... | 290..... |
| 30. Cost of fuel per gallon..... | 22.2 cents..... | 25 cents..... | 25 cents per gallon..... | 19.5 cents..... | 19.7 cents..... |
| | <i>Remarks.</i>
Operated on inland waterway, Norfolk, Va., to Beaufort Inlet, N. C. | <i>Remarks.</i>
Patrol duty Staten Island Sound, Raritan Bay, New-York Bay, and tributary waters. | <i>Remarks.</i>
Surveys and inspection of Winyah Bay and tributaries. | <i>Remarks.</i>
The launch was used in making survey of Grand River, survey of Muskegon River, and permit survey of various harbors on the east shore of Lake Michigan. Measured tonnage; displacement not known. | <i>Remarks.</i>
Boat used for survey work, inspection and patrol of rivers, light towing, and soundings at river landings on Allegheny, Ohio, and Monongahala Rivers up to about Apr. 6; since that time towing and reconstruction work at Dam No. 11, Monongahela River. |

| Name..... | <i>Lydecker, Gen. G. J., No. 1.</i> | <i>Lydecker, Gen. G. J., No. 2.</i> | <i>Mac Must.</i> | <i>Maguire, Captain.</i> | <i>Med.</i> |
|---|---|---|--|---|---------------------|
| 1. District..... | Detroit, Mich..... | Detroit, Mich..... | Honolulu..... | Jacksonville, Fla..... | Jacksonville, Fla. |
| 2. Where built..... | South Boston, Mass..... | South Boston, Mass..... | Unknown..... | Palatka, Fla..... | Do. |
| 3. When built..... | 1909..... | 1909..... | do..... | 1897..... | 1913. |
| 4. Builder..... | ..... | ..... | do..... | W. M. Boyd..... | Merrill-Stevens Co. |
| 5. Time to build..... | Toledo, Ohio..... | Toledo, Ohio..... | Honolulu..... | Not known..... | 1 month. |
| 6. Where purchased..... | May, 1913..... | May, 1913..... | 1916..... | Palatka, Fla..... | Jacksonville, Fla. |
| 7. When purchased..... | Edward Ford..... | Edward Ford..... | Honolulu Scrap Iron Co..... | 1902..... | 1913. |
| 8. From whom purchased..... | Included in cost of steamer
Gen. G. J. Lydecker. | Included in cost of steamer
Gen. G. J. Lydecker. | \$200..... | John Tilghman..... | Merrill-Stevens Co. |
| 9. Purchase price..... | ..... | ..... | ..... | \$5,000..... | \$534. |
| 10. Contract cost..... | ..... | ..... | ..... | Included in purchase price..... | \$534. |
| 11. Complete cost with outfit..... | ..... | ..... | \$526.36..... | ..... | \$534. |
| 12. Present value..... | \$400..... | \$350..... | \$800..... | \$1,950..... | (1). |
| 13. Hull: | | | | | |
| (a) Material of hull..... | Wood..... | Wood..... | Wood..... | Wood..... | Wood. |
| (b) Length over all..... | 20 feet..... | 15 feet 6 inches..... | 30 feet 6 inches..... | 67 feet..... | 18 feet. |
| (c) Length on water line..... | ..... | 15 feet..... | ..... | ..... | 17 feet 7 inches. |
| (d) Beam over all..... | 5 feet..... | 4 feet 6 inches..... | 8 feet 4 inches..... | 17 feet 7 inches..... | 5 feet 10 inches. |
| (e) Beam on water line..... | 4 feet 1 inch..... | 4 feet 2 inches..... | 8 feet..... | 15 feet 9 inches..... | 4 feet 5 inches. |
| (f) Depth of hull forward..... | 2 feet 3 inches..... | 1 foot 11 inches..... | 3 feet 6 inches..... | 4 feet 8 inches..... | 2 feet 9 inches. |
| (g) Depth of hull amidships..... | 2 feet..... | 1 foot 9 inches..... | 3 feet 10 inches..... | 4 feet..... | 2 feet 5 inches. |
| (h) Depth of hull aft..... | 1 foot 5 inches..... | 1 foot 11 inches..... | 2 feet 4 inches..... | 3 feet 2 inches..... | 1 foot 10 inches. |
| (i) Draft forward..... | 1 foot 1 inch..... | 8 inches..... | 1 foot four inches..... | 1 foot 1 inch..... | 9 inches. |
| (j) Draft aft..... | 1 foot 3 inches..... | 1 foot 3 inches..... | 3 feet 3 inches..... | 3 feet..... | 2 feet. |
| (k) Draft to bottom of propeller..... | 1 foot 10 inches..... | 1 foot 10 inches..... | 3 feet 4 inches..... | 2 feet 3 inches..... | 1 foot 10 inches. |
| (l) Depth of keel from bottom of outside of planking..... | Flush..... | 1½ inches..... | 5 inches..... | 2 inches..... | 3 inches. |
| (m) Displacement (long tons)..... | ..... | ..... | ..... | 49 (estimated)..... | 0.95. |
| (n) Speed in statute miles per hour..... | 7..... | 7..... | 8..... | 7..... | 7.04. |
| 14. Horse: | | | | | |
| (a) Length..... | ..... | ..... | 11 feet 2 inches..... | 48 feet 4 inches..... | None. |
| (b) Width..... | ..... | ..... | 6 feet 3 inches..... | 16 feet 9 inches..... | ..... |
| (c) Height above deck..... | ..... | ..... | 1 foot 2 inches forward to 2 feet aft..... | 8 feet 6 inches..... | ..... |
| (d) Accommodations..... | ..... | ..... | Will carry 26 men..... | 11 pipe hammocks, galley, and toilet..... | Fired seats. |

TABLE XVII.—*Report of operations of gasoline launches (crew) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | <i>Lylecker, Gen. G. J., No. 1.¹</i> | <i>Lylecker, Gen. G. J., No. 2.¹</i> | <i>Mac Mead.</i> | <i>Maguire, Captain.</i> | <i>Med.</i> |
|---|---|---|-------------------------------|-----------------------------------|--------------------------|
| 15. Motors: | | | | | |
| (a) Number..... | 1..... | 1..... | One 3-cylinder gasoline..... | 1..... | 1. |
| (b) Type..... | 4-cycle..... | 4-cycle..... | Automarine..... | No record..... | 2-cycle. |
| (c) When built..... | 1915..... | 1915..... | Unknown..... | ..... | 1915. |
| (d) Make..... | Buffalo..... | Buffalo..... | Automarine..... | Lamb Boat & Engine Co..... | Fulton Manufacturing Co. |
| (e) Number of cylinders (one engine)..... | 2..... | 2..... | 3..... | 4..... | 2 |
| (f) Diameter of cylinder..... | 3 inches..... | 3 inches..... | 6 inches..... | 6½ inches..... | 4½ inches. |
| (g) Stroke..... | 4 inches..... | 4 inches..... | 6½ inches..... | 7 inches..... | 5 inches. |
| (h) Revolutions per minute..... | 275..... | 275..... | 450..... | 475..... | 475. |
| (i) Rated brake horsepower..... | 4..... | 4..... | 15..... | 40..... | 10-12. |
| (j) Weight of one motor..... | 175 pounds..... | 175..... | 1,050 pounds (approximately). | 2,150..... | 500 pounds. |
| 16. Propeller: | | | | | |
| (a) Number of blades..... | 2..... | 4..... | 2..... | 3..... | 3. |
| (b) Diameter..... | 13 inches..... | 14 inches..... | 18 inches..... | 36 inches..... | 20 inches. |
| (c) Pitch..... | 13 inches..... | 12 inches..... | 4½ inches..... | 40 inches..... | 24 inches. |
| (d) Diameter of shaft..... | ½ inch..... | ½ inch..... | 1½ inches..... | 2½ inches..... | 1½ inches. |
| 17. Heating system: | | | | | |
| (a) Type..... | ..... | ..... | ..... | None..... | None. |
| (b) Size of heater..... | ..... | ..... | ..... | do..... | do. |
| (c) Number of radiators..... | ..... | ..... | ..... | do..... | do. |
| 18. Electric-light plant: | | | | | |
| (a) Make..... | ..... | ..... | ..... | do..... | Do. |
| (b) Type of motor..... | ..... | ..... | ..... | do..... | do. |
| (c) Brake horsepower..... | ..... | ..... | ..... | do..... | do. |
| (d) Revolutions per minute..... | ..... | ..... | ..... | do..... | do. |
| (e) Capacity of generator in kilowatts..... | ..... | ..... | ..... | do..... | do. |
| (f) Number of lights..... | ..... | ..... | ..... | do..... | do. |
| (g) Average candle-power per light..... | ..... | ..... | ..... | do..... | do. |
| (h) Diameter of searchlight..... | ..... | ..... | ..... | do..... | do. |
| 19. Number of men in crew..... | ..... | ..... | 1 engineerman..... | 2 to 7, depending on service..... | 1. |

FLOATING PLANT.

4577

| OPERATING COST. | | | | | |
|--|---|--|--|---|------------|
| 20. Pay roll..... | | \$604.83 | \$3,482.00 | \$300.00 | |
| 21. Subsistence..... | | 352.25 | 919.43 | (*) 511.08 | |
| 22. Fuel..... | \$3.90 | 111.25 | 363.79 | 23.75 | |
| 23. Supplies (machinery)..... | | | | | |
| 24. Repairs: | | | | | |
| (a) Hull..... | | 126.00 | 194.99 | 107.75 | |
| (b) Machinery..... | | 132.61 | 772.96 | | |
| 25. Additions and alterations..... | | | 22.50 | | |
| 26. Miscellaneous..... | | * 104.57 | 200.40 | 9.35 | |
| 27. Total..... | \$3.90 | | \$5,540.04 | 4,641. | \$1,562.93 |
| 28. Approximate number of miles run during year..... | | 5,000. | 1,090 ¹ | | |
| 29. Number of days in commission..... | | 325. | 366. | 310. | |
| 30. Cost of fuel per gallon..... | 19 to 20 cents. | 18.2 cents. | 20½ cents. | 13½ cents. | |
| | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | |
| | Used as a yawl in connection with steamer Gen. G. J. Lydecker.
1 Formerly Gladwin No. 1. | The launch was operated between Fort Kamelameha and Ford's Island to carry laborers to and from work, and towing material for constructing batteries, and occasionally made trips to Honolulu. | Used as a quarter boat for survey party on the St. Johns River, Fla., and in removing hyacinth from the tributaries of the St. Johns River, in removing obstructions in the St. Johns and Oluwaha Rivers.
1 Of which 19 miles was towing. | Operated on St. Johns River, Fla., Jacksonville to the ocean, as despatch boat and tender to the dredge Major J. C. Mallory.
1 The hull and engine have become worn out in the service and await condemnation at Mayport, Fla.
2 Subsistence furnished from dredge Major J. C. Mallory. | |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Builder. | Mamie K. | Maker. | Maurepas. | Meyer, Captain J. J. |
|---|-----------------------|---------------------------------------|-----------------------|---------------------------------------|---------------------------------|
| 1. District..... | Milwaukee, Wis..... | Mobile, Ala..... | Nashville, Tenn..... | New Orleans, La..... | Jacksonville, Fla..... |
| 2. Where built..... | ..... | Morris Heights, N. Y..... | Leavenworth, Ind..... | Piquemine, La..... | Port Clinton, Ohio..... |
| 3. When built..... | ..... | 1882..... | 1913..... | 1913..... | 1912..... |
| 4. Builder..... | ..... | Chas. L. Seabury & Co. (contractors). | D. Lyon Skiff Co..... | U. S. Engineer Department..... | Matthews Boat Co..... |
| 5. Time to build..... | Two Rivers, Wis..... | Not known..... | Leavenworth, Ind..... | 2½ months..... | 4 months..... |
| 6. Where purchased..... | ..... | Mobile, Ala..... | 1913..... | ..... | Port Clinton, Ohio..... |
| 7. When purchased..... | ..... | 1882..... | D. Lyon Skiff Co..... | ..... | 1912..... |
| 8. From whom purchased..... | Kallenberg Bros..... | Same as item No. 4..... | 46..... | ..... | Matthews Boat Co..... |
| 9. Purchase price..... | \$1,080..... | \$1,000..... | \$173.80..... | \$2,115.16..... | \$16,970..... |
| 10. Contract cost..... | \$1,080..... | \$1,000..... | \$99..... | \$2,000..... | \$17,431.17..... |
| 11. Complete cost with outfit..... | \$400..... | \$200..... | ..... | ..... | \$14,000..... |
| 12. Present value..... | ..... | ..... | ..... | ..... | ..... |
| 13. Hull: | ..... | ..... | ..... | ..... | ..... |
| (a) Material of hull..... | Wood..... | Wood..... | Wood..... | Wood..... | Wood..... |
| (b) Length over all..... | 35 feet..... | 25 feet..... | 20 feet..... | 38 feet 6 inches..... | 70 feet 6 inches..... |
| (c) Length on water line..... | 31 feet..... | 22 feet 8 inches..... | 19 feet..... | 33 feet 5 inches..... | 64 feet 2 inches..... |
| (d) Beam over all..... | 9 feet..... | 6 feet..... | 4 feet 9 inches..... | 10 feet 6½ inches..... | 15 feet..... |
| (e) Beam on water line..... | 8 feet 1 inch..... | 5 feet 8 inches..... | 3 feet 8 inches..... | 9 feet 5 inches..... | 13 feet 10 inches..... |
| (f) Depth of hull forward..... | 4 feet 2 inches..... | 3 feet 11 inches..... | 3 feet 2 inches..... | 5 feet 3¼ inches..... | 10 feet 6 inches..... |
| (g) Depth of hull amidships..... | 4 feet 2 inches..... | 3 feet 3 inches..... | 1 foot 7 inches..... | 4 feet..... | 7 feet 8 inches..... |
| (h) Depth of hull aft..... | 4 feet..... | 4 feet 3 inches..... | 1 foot..... | 4 feet 1½ inches..... | 4 feet 6 inches..... |
| (i) Draft forward..... | 1 foot 3 inches..... | 1 foot 8 inches..... | 1 foot..... | 1 foot 9 inches..... | 3 feet 4 inches..... |
| (j) Draft at..... | 3 feet 7 inches..... | 3 feet..... | 1 foot..... | 3 feet..... | 3 feet 9 inches..... |
| (k) Draft to bottom of propeller..... | 3 feet 4 inches..... | 3 feet..... | 1 foot 4 inches..... | 3 feet 10 inches..... | 3 feet 8 inches..... |
| (l) Depth of keel from bottom of outside of planking..... | 8 inches..... | No keel; skeg at aft end..... | 10 inches..... | 6½ inches..... | 2 inches..... |
| (m) Displacement (long tons)..... | 8..... | 2..... | ½..... | 15..... | 43.16..... |
| (n) Speed in statute miles per hour..... | 8½..... | 7½..... | 6½..... | About 7½..... | 9.3..... |
| 14. House: | ..... | ..... | ..... | ..... | ..... |
| (a) Length..... | 16 feet..... | 17 feet..... | ..... | 14 feet 2 inches..... | 38 feet..... |
| (b) Width..... | 5 feet 4 inches..... | 4 feet 0 inches..... | ..... | 7 feet ¾ inches..... | 10 feet 4 inches..... |
| (c) Height above deck..... | 3 feet 7½ inches..... | 3 feet 9 inches..... | ..... | 41 inches aft, 40 inches forward..... | 7 feet and ½ feet 4 inches..... |
| (d) Accommodations..... | None..... | Seat for 12 persons..... | ..... | Seating capacity for 6..... | 11 berths, galley and bath..... |

15. Motors.

| (a) Number. | (b) Type. | (c) When built. | (d) Make. | (e) Number of cylinders (if engine). | (f) Diameter of cylinder. | (g) Stroke. | (h) Revolutions per minute. | (i) Rated brake horsepower (total). | (j) Weight of one motor. | 16. Propeller: | (a) Number of blades. | (b) Diameter. | (c) Pitch. | (d) Diameter of shaft. | 17. Heating system: | (a) Type. | (b) Size of heater. | (c) Number of radiators. | 18. Electric-light plant: | (a) Make. | (b) Type of motor. | (c) Brake horsepower. | (d) Revolutions per minute. | (e) Capacity of generator in kilowatts. | (f) Number of lights. | (g) Average candle-power per light. | (h) Diameter of searchlight. | 19. Number of men in crew. |
|-------------|--------------------------|-----------------|--|--------------------------------------|---------------------------|-------------|-----------------------------|-------------------------------------|--------------------------|----------------|-----------------------|---------------|------------|------------------------|---------------------------------------|------------------|---------------------|--------------------------|---------------------------|-----------|--------------------|-----------------------|-----------------------------|---|-----------------------|-------------------------------------|------------------------------|----------------------------|
| 1. | 2-cycle, make-and-break. | 1907. | Kahlenberg. | 64 | 10 inches. | 7 inches. | 335. | 16. | 1,600 pounds. | 4. | 2 feet 10 inches. | 34 inches. | 18 inches. | 2 inches. | None. | None. | None. | None. | None. | None. | None. | None. | None. | None. | None. | None. | None. | None. |
| 2. | 2-cycle. | Not known. | Rochester Gas Engine, Rochester, N. Y. | 44 | 10 inches. | 5 inches. | Not known. | 16. | 560 pounds. | 3. | 17 inches. | 16 inches. | 18 inches. | 1 1/2 inches. | None. | do. | do. | do. | do. | do. | do. | do. | do. | do. | do. | do. | do. | do. |
| 3. | 2-cycle, gasoline. | Not known. | J. W. Lathrop. | 44 | 10 inches. | 5 inches. | 450. | 4. | 2,885 pounds. | 3. | 15 inches. | 34 inches. | 30 inches. | 2 inches. | Hot-water, American Radiator No. 101. | 12 by 30 inches. | 12. | General Electric Co. | 2-cycle. | 1. | 1,200. | 1. | 27. | 16. | 94, inside diameter. | 5. | | |
| 4. | 2-cycle, heavy duty. | 1912. | Buffalo. | 7 | 7 inches. | 9 inches. | 37 1/2. | 72. | 3,600 pounds. | 3. | 34 inches. | 38 inches. | 24 inches. | 2 inches. | Hot-water, American Radiator No. 101. | 12 by 30 inches. | 12. | General Electric Co. | 2-cycle. | 1. | 1,200. | 1. | 27. | 16. | 94, inside diameter. | 5. | | |
| 5. | 2-cycle, gasoline. | Not known. | J. W. Lathrop. | 44 | 10 inches. | 5 inches. | 450. | 4. | 2,885 pounds. | 3. | 15 inches. | 34 inches. | 30 inches. | 2 inches. | Hot-water, American Radiator No. 101. | 12 by 30 inches. | 12. | General Electric Co. | 2-cycle. | 1. | 1,200. | 1. | 27. | 16. | 94, inside diameter. | 5. | | |
| 6. | 2-cycle, gasoline. | Not known. | J. W. Lathrop. | 44 | 10 inches. | 5 inches. | 450. | 4. | 2,885 pounds. | 3. | 15 inches. | 34 inches. | 30 inches. | 2 inches. | Hot-water, American Radiator No. 101. | 12 by 30 inches. | 12. | General Electric Co. | 2-cycle. | 1. | 1,200. | 1. | 27. | 16. | 94, inside diameter. | 5. | | |
| 7. | 2-cycle, gasoline. | Not known. | J. W. Lathrop. | 44 | 10 inches. | 5 inches. | 450. | 4. | 2,885 pounds. | 3. | 15 inches. | 34 inches. | 30 inches. | 2 inches. | Hot-water, American Radiator No. 101. | 12 by 30 inches. | 12. | General Electric Co. | 2-cycle. | 1. | 1,200. | 1. | 27. | 16. | 94, inside diameter. | 5. | | |
| 8. | 2-cycle, gasoline. | Not known. | J. W. Lathrop. | 44 | 10 inches. | 5 inches. | 450. | 4. | 2,885 pounds. | 3. | 15 inches. | 34 inches. | 30 inches. | 2 inches. | Hot-water, American Radiator No. 101. | 12 by 30 inches. | 12. | General Electric Co. | 2-cycle. | 1. | 1,200. | 1. | 27. | 16. | 94, inside diameter. | 5. | | |
| 9. | 2-cycle, gasoline. | Not known. | J. W. Lathrop. | 44 | 10 inches. | 5 inches. | 450. | 4. | 2,885 pounds. | 3. | 15 inches. | 34 inches. | 30 inches. | 2 inches. | Hot-water, American Radiator No. 101. | 12 by 30 inches. | 12. | General Electric Co. | 2-cycle. | 1. | 1,200. | 1. | 27. | 16. | 94, inside diameter. | 5. | | |
| 10. | 2-cycle, gasoline. | Not known. | J. W. Lathrop. | 44 | 10 inches. | 5 inches. | 450. | 4. | 2,885 pounds. | 3. | 15 inches. | 34 inches. | 30 inches. | 2 inches. | Hot-water, American Radiator No. 101. | 12 by 30 inches. | 12. | General Electric Co. | 2-cycle. | 1. | 1,200. | 1. | 27. | 16. | 94, inside diameter. | 5. | | |
| 11. | 2-cycle, gasoline. | Not known. | J. W. Lathrop. | 44 | 10 inches. | 5 inches. | 450. | 4. | 2,885 pounds. | 3. | 15 inches. | 34 inches. | 30 inches. | 2 inches. | Hot-water, American Radiator No. 101. | 12 by 30 inches. | 12. | General Electric Co. | 2-cycle. | 1. | 1,200. | 1. | 27. | 16. | 94, inside diameter. | 5. | | |
| 12. | 2-cycle, gasoline. | Not known. | J. W. Lathrop. | 44 | 10 inches. | 5 inches. | 450. | 4. | 2,885 pounds. | 3. | 15 inches. | 34 inches. | 30 inches. | 2 inches. | Hot-water, American Radiator No. 101. | 12 by 30 inches. | 12. | General Electric Co. | 2-cycle. | 1. | 1,200. | 1. | 27. | 16. | 94, inside diameter. | 5. | | |
| 13. | 2-cycle, gasoline. | Not known. | J. W. Lathrop. | 44 | 10 inches. | 5 inches. | 450. | 4. | 2,885 pounds. | 3. | 15 inches. | 34 inches. | 30 inches. | 2 inches. | Hot-water, American Radiator No. 101. | 12 by 30 inches. | 12. | General Electric Co. | 2-cycle. | 1. | 1,200. | 1. | 27. | 16. | 94, inside diameter. | 5. | | |
| 14. | 2-cycle, gasoline. | Not known. | J. W. Lathrop. | 44 | 10 inches. | 5 inches. | 450. | 4. | 2,885 pounds. | 3. | 15 inches. | 34 inches. | 30 inches. | 2 inches. | Hot-water, American Radiator No. 101. | 12 by 30 inches. | 12. | General Electric Co. | 2-cycle. | 1. | 1,200. | 1. | 27. | 16. | 94, inside diameter. | 5. | | |
| 15. | 2-cycle, gasoline. | Not known. | J. W. Lathrop. | 44 | 10 inches. | 5 inches. | 450. | 4. | 2,885 pounds. | 3. | 15 inches. | 34 inches. | 30 inches. | 2 inches. | Hot-water, American Radiator No. 101. | 12 by 30 inches. | 12. | General Electric Co. | 2-cycle. | 1. | 1,200. | 1. | 27. | 16. | 94, inside diameter. | 5. | | |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name | Mallard. | Mamie K. | Mosker. | Maurepas. | Meyler, Captain J. J. |
|--|---|--|-----------|---|---|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | \$330.80 | | \$40.00 | | \$4,100.00 |
| 21. Subsistence..... | | (1) | 11.00 | | 1,154.50 |
| 22. Fuel..... | 248.82 | (1) | 90.80 | \$317.58 | 795.50 |
| 23. Supplies (machinery)..... | 34.59 | (1) | 9.56 | 16.25 | 176.20 |
| 24. Repairs: | | | | | |
| (a) Hull..... | 1.08 | (1) | | | 1,611.90 |
| (b) Machinery..... | 41.29 | (1) | 9.65 | 32.40 | 805.90 |
| 25. Additions and alterations..... | 37.63 | (1) | | | 165.70 |
| 26. Miscellaneous..... | 12.30 | (1) | 6.33 | | 256.46 |
| 27. Total..... | \$756.51 | | \$187.89 | | \$9,126.16 |
| 28. Approximate number of miles run during year..... | 2,545 | None..... | 2,111 | 5,000 | Towing, 1,208; light, 5,155. |
| 29. Number of days in commission..... | 224 | do..... | 231 | 213 | 365. |
| 30. Cost of fuel per gallon..... | 18.5 cents. | do..... | 24 cents. | 19.7 cents. | 18.5 cents. |
| | <i>Remarks.</i> | <i>Remarks.</i> | | <i>Remarks.</i> | <i>Remarks.</i> |
| | Operated at Sturgeon Bay and Lake Michigan. Ship Canal from Apr. 5 to July 1 and employed in running to and from the city of Sturgeon Bay about 4 miles distant, transporting employees, supplies, etc. Operated on Fox and Wolf River survey balance of season, transferring employees to and from work, carrying supplies, etc. | This boat was not in commission during the year; engine removed from boat to shop and some repairs being made to machinery.
None. | | Tender to U. S. dredge Delatour, transporting mail, supplies, and employees to and from dredge, used on inspection of streams, etc. | As dispatch and inspection boat on the St. Johns River and tributaries and the channel between St. Johns River and Cumberland Sound, Ga. and Fla. |

| Name | Marquette. | Myron. | Mifflin. | Milledge. | Minnehaha. |
|--|-----------------------------|------------------------------|-------------------------------|----------------------------|---|
| 1. District..... | Galveston, Tex..... | First, Cincinnati, Ohio..... | Philadelphia, Pa..... | Norfolk, Va..... | Rock Island, Ill..... |
| 2. Where built..... | Wareham, Mass..... | Salem, Ohio..... | Candem, N. J..... | Rossmore Island, N. C..... | St. Paul, Minn..... |
| 3. When built..... | 1916..... | 1910..... | 1915-16..... | 1912..... | 1912..... |
| 4. Builder..... | Cape Cod Power Dory Co..... | Mullins Boat Co..... | Mathis Yacht Building Co..... | W. O. Dough..... | Joe Dingle..... |
| 5. Time to build..... | Wareham, Mass..... | Not known..... | 11 months..... | 30 days..... | 6 months..... |
| 6. Where purchased..... | 1916..... | Cincinnati, Ohio..... | October, 1910..... | 1912..... | St. Paul, Minn..... |
| 7. From whom purchased..... | Cape Cod Power Dory Co..... | October, 1910..... | W. O. Dough..... | W. O. Dough..... | Joe Dingle..... |
| 8. Purchase price..... | \$1,764..... | \$388.43..... | \$388.43..... | \$388.43..... | \$1,516.72..... |
| 9. Contract cost..... | | \$388.43..... | \$19,350..... | \$375..... | \$1,492.50..... |
| 10. Complete cost with outfit..... | | \$388.43..... | \$19,312.90..... | \$375..... | \$1,516.72..... |
| 11. Present value..... | \$1,750..... | \$300.00..... | \$19,260..... | \$200..... | \$703.88..... |
| 12. Hull: | Wood..... | Steel..... | Wood..... | Wood..... | Wood..... |
| (a) Material of hull..... | 30 feet 6 inches..... | 18 feet 4 inches..... | 79 feet 10 inches..... | 22 feet 6 inches..... | 35 feet 2 inches..... |
| (b) Length over all..... | 29 feet 6 inches..... | 17 feet 10 inches..... | 72 feet 3 inches..... | 21 feet..... | 34 feet 11 inches..... |
| (c) Length on water line..... | | | | | |
| (d) Beam over all..... | 8 feet 10 inches..... | 5 feet 2 inches..... | 15 feet..... | 6 feet 6 inches..... | 6 feet 2 1/2 inches..... |
| (e) Beam on water line..... | 7 feet 4 inches..... | 5 feet 10 inches..... | 14 feet 8 inches..... | 5 feet..... | 5 feet 7 1/2 inches..... |
| (f) Depth of hull forward..... | 4 feet 2 inches..... | 2 feet 5 inches..... | 8 feet 4 inches..... | 3 feet 6 inches..... | 3 feet 6 inches..... |
| (g) Depth of hull amidships..... | 3 feet 10 inches..... | 2 feet 1 inch..... | 8 feet 10 inches..... | 2 feet 6 inches..... | 3 feet 3/4 inch..... |
| (h) Depth of hull aft..... | 3 feet 6 inches..... | 1 foot 6 inches..... | 6 feet 3 inches..... | 2 feet 9 inches..... | 2 feet 2 1/2 inches..... |
| (i) Draft forward..... | 3 feet 3 inches..... | 4 inches..... | 4 feet 4 inches..... | 1 foot 6 inches..... | 10 1/2 inches..... |
| (j) Draft at..... | 2 feet 8 inches..... | 2 inches..... | 5 feet 2 inches..... | 2 feet..... | 24 inches..... |
| (k) Draft to bottom of propeller..... | 2 feet 6 inches..... | 1 foot 3 inches..... | 5 feet..... | 2 feet..... | 24 inches..... |
| (l) Depth of keel from bottom of outside of plating..... | 4 inches..... | 6 inches..... | 1 foot (amidships)..... | 6 inches..... | 26 and 30 inches to bottom of keel..... |
| (m) Displacement (long tons)..... | 4..... | 0.5..... | 49..... | 1..... | None..... |
| (n) Speed in statute miles per hour..... | 9..... | 9 to 10..... | 13.6..... | 7 1/2..... | 2.06..... |
| 14. House: | | | | | |
| (a) Length..... | 17 feet..... | None..... | 12 feet..... | None..... | Leather Canyon top 11 feet..... |
| (b) Width..... | 8 feet..... | | 9 feet..... | | 14 inches..... |
| (c) Height above deck..... | 3 feet 7 inches..... | | 6 feet 8 inches..... | | 5 feet 2 1/2 inches..... |
| (d) Accommodations..... | 2 men..... | Carry 8..... | 15..... | | 3 feet 6 1/2 inches..... |

TABLE XVII.—Report of operations of gasoline launches (crew) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Mcquitz. | Myron. | Miffin. | Murdle. | Mitchala. |
|---|------------------|--------------------------------|--------------------------------|---|--|
| 1A. Motors: | | | | | |
| (a) Number..... | 1..... | 1..... | 2..... | 1..... | 1..... |
| (b) Type..... | 4-cycle..... | 2-cycle..... | Gasoline, 4-cycle..... | 2-cycle..... | 4-cycle..... |
| (c) When built..... | 1916..... | 1916..... | 1916..... | 1916..... | 1912..... |
| (d) Make..... | Palmer Bros..... | Eagle Model 2-K..... | Murray & Tregurtha..... | Mianus Motor Works, Stamford, Conn..... | The Capital Auto Engine Works, St. Paul, Minn..... |
| (e) Number of cylinders (one engine)..... | 4..... | 2..... | 4..... | 1..... | 4..... |
| (f) Diameter of cylinder..... | 5 inches..... | 3½ inches..... | 3½ inches..... | 5½ inches..... | 5½ inches..... |
| (g) Stroke..... | 6 inches..... | 3½ inches..... | 11 inches..... | 6 inches..... | 6 inches..... |
| (h) Revolutions per minute..... | 250-500..... | 800 to 1,000..... | 340 at 12 miles per hour..... | 450..... | 980 to 998..... |
| (i) Rated brake horsepower (total)..... | 20..... | 7 (manufacturer's rating)..... | 170..... | 7½..... | 36½..... |
| (j) Weight of one motor..... | 800 pounds..... | 136 pounds..... | 6,000 pounds..... | 415 pounds..... | 675 pounds..... |
| 1A. Propeller: | | | | | |
| (a) Number of blades..... | 3..... | 3..... | 3..... | 3..... | 3..... |
| (b) Diameter..... | 24 inches..... | 13 inches..... | 38 inches..... | 21 inches..... | 22 inches..... |
| (c) Pitch..... | do..... | 17 inches..... | 48 inches..... | 26 inches..... | Do..... |
| (d) Diameter of shaft..... | 1½ inches..... | 2 inch..... | 2½ inches..... | 1½ inches..... | 1½ inches..... |
| 17. Heating system: | | | | | |
| (a) Type..... | None..... | None..... | Steam..... | None..... | None..... |
| (b) Size of heater..... | ..... | ..... | 375 square feet radiation..... | ..... | ..... |
| (c) Number of radiators..... | ..... | ..... | 10..... | ..... | ..... |
| 18. Electric-light plant: | | | | | |
| (a) Make..... | None..... | None..... | General Electric Co..... | None..... | None..... |
| (b) Type of motor..... | ..... | ..... | 2-cycle gasoline..... | ..... | ..... |
| (c) Brake horsepower..... | ..... | ..... | 14..... | ..... | ..... |
| (d) Revolutions per minute..... | ..... | ..... | 760..... | ..... | ..... |
| (e) Capacity of generator in kilowatts..... | ..... | ..... | 1..... | ..... | ..... |
| (f) Number of lights..... | ..... | ..... | 30..... | ..... | ..... |
| (g) Average candle-power per light..... | ..... | ..... | 12..... | ..... | ..... |
| (h) Diameter of searchlight..... | ..... | ..... | None..... | ..... | ..... |
| 19. Number of men in crew..... | 1..... | No crew..... | 4..... | 1..... | 1..... |

4583

Digitized by Google

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Minnetonka. | Mingus. | Mohawk. | Monticau. | Monomoy. |
|---|--|-------------------|------------------------|------------------|-------------------------------------|
| 1. District..... | Rock Island, Ill. | Wilmington, Del. | Second Portland, Oreg. | Kansas City, Mo. | Newport, R. I. |
| 2. Where built..... | St. Paul, Minn. | Holly Oak, Del. | Portland, Oreg. | Gasconade, Mo. | Marquette, Mich. |
| 3. When built..... | 1913 | 1915 | O. P. Graham | 1914 | 1914 |
| 4. Builder..... | Joe. Dingle | George C. Morris | | United States | Racine-Truscott Shell Lake Boat Co. |
| 5. Time to build..... | 9 months | About 3 months | 60 days | 10 days | 8 months |
| 6. Where purchased..... | St. Paul, Minn. | Holly Oak, Del. | | | |
| 7. When purchased..... | 1913 | 1 | | | |
| 8. From whom purchased..... | Joe. Dingle | 1 | | | |
| 9. Purchase price..... | \$1,724 | 1 | | | |
| 10. Contract cost..... | \$1,724 | 1 | \$1,800 | \$298.92 | \$27,581.67 |
| 11. Complete cost with outfit..... | \$1,724 | 1 | \$1,835 | \$299.78 | \$29,322.14 |
| 12. Present value..... | \$1,134.32 | \$800 | \$500 | \$225 | \$26,000 |
| 13. Hull: | | | | | |
| (a) Material of hull..... | Wood (cypress) | Wood | Wood | Wood | Wood |
| (b) Length over all..... | 25 feet 2 inches | 18 feet 2 inches | 25 feet | 24 feet | 82 feet 9 inches |
| (c) Length on water line..... | 34 feet 11 inches | 16 feet 3 inches | 32 feet 6 inches | 24 feet | 76 feet 8 inches |
| (d) Beam over all..... | 6 feet 2½ inches | 5 feet 2½ inches | 8 feet 6 inches | 5 feet | 16 feet |
| (e) Beam on water line..... | 5 feet 1½ inches | 5 feet 2½ inches | 7 feet 6 inches | 4 feet 8 inches | 15 feet 6 inches |
| (f) Depth of hull forward..... | 3 feet 6 inches | 2 feet 11½ inches | 4 feet 9 inches | 2 feet 8 inches | 10 feet |
| (g) Depth of hull amidships..... | 3 feet 1 inch | 2 feet 8½ inches | 3 feet 9 inches | 2 feet 2 inches | 9 feet 6 inches |
| (h) Depth of hull aft..... | 2 feet 2½ inches | 2 feet 6 inches | 4 feet 3 inches | 1 foot 10 inches | 9 feet 9 inches |
| (i) Draft forward..... | 10½ inches | 1 foot 2 inches | 2 feet | 4 feet 4 inches | 4 feet 8 inches |
| (j) Draft aft..... | 21 inches | 1 foot 10 inches | 2 feet 10 inches | 5½ inches | 5 feet 6 inches |
| (k) Draft to bottom of propeller..... | 24 and 30 inches to bottom of guard | 1 foot 8½ inches | 2 feet 7 inches | 1 foot 6 inches | 5 feet 6 inches |
| (l) Depth of keel from bottom of outside of planking..... | No keel | 3 inches | 3 inches | No keel | 6 inches |
| (m) Displacement (long tons)..... | 2.05 | | 5½ | 1 | 62 |
| (n) Speed in statute miles per hour..... | 16 miles down river, 12 miles up, 14 miles on Lake Keweenaw. | About 8 | 8 | 6 | 11 |
| 14. House: | | | | | |
| (a) Length..... | Kanyon top (leather), 11 feet 9 inches. | None | 12 feet | None | 60 feet 6 inches |
| (b) Width..... | 5 feet 2½ inches | 5 feet | 5 feet | | 11 feet |

| (c) Height above deck. | | 3 feet 6 1/2 inches. | 5 feet 10 inches. | 2 feet 6 inches aft; 7 feet forward. |
|--|--|----------------------|-------------------|---|
| (d) Accommodations 4 chairs and 2 seats. | | | None. | 5 staterooms and 4 berths. |
| 15. Motors. | | | | |
| (a) Number. | 1. | | 1. | 1. |
| (b) Type. | 4-cycle. | | 4-cycle. | 4-cycle. |
| (c) When built. | 1915. | | 1910. | 1914. |
| (d) Make. | The Capitol Auto Engine Works, St. Paul, Minn. | | Lamb. | Corliss. |
| (e) Number of cylinders (1 engine). | 4. | | 4. | 6. |
| (f) Diameter of cylinder. | 5 1/2 inches. | | 4 1/2 inches. | 9 inches. |
| (g) Stroke. | 6 inches. | | 6 inches. | 10 1/2 inches. |
| (h) Revolutions per minute. | 822 to 906. | | 600. | 300. |
| (i) Rated brake horsepower (total). | 35. | | 24. | 125. |
| (j) Weight of 1 motor. | 675 pounds. | | 1,180 pounds. | 12,000 pounds. |
| 16. Propeller. | | | | |
| (a) Number of blades. | 3. | | 3. | 3. |
| (b) Diameter. | 10 inches. | | 24 inches. | 48 inches. |
| (c) Pitch. | 28 inches. | | 22 inches. | 54 inches. |
| (d) Diameter of shaft. | 1 1/2 inches. | | 1 1/2 inches. | 3 inches. |
| (e) Heating system. | None. | | None. | Hot water. |
| (f) Type. | | | | 20 1/2 by 42 1/2 inches; 15-inch grate. |
| (g) Size of heater. | | | | 14. |
| (c) Number of radiators. | | | | |
| 18. Electric-light plant. | | | | |
| (a) Make. | None. | | None. | General Electric Co. |
| (b) Type of motor. | | | | 2-cycle gasoline. |
| (c) Brake horsepower. | | | | 3. |
| (d) Revolutions per minute. | | | | 1,200. |
| (e) Capacity of generator in kilowatts. | | | | 1. |
| (f) Number of lights. | | | | |
| (g) Average candle-power per light. | | | | 44. |
| (h) Diameter of searchlight. | | | | 16. |
| (i) Number of men in crew. | 11. | | No regular crew. | 10 inches. |
| | | | | 2 officers, 5 men. |

TABLE XVII.—Report of operations of gasoline launches (crew) for the calendar year ending Dec. 31, 1916—Continued.

| Name. | Minnicista. | Mingus. | Mohave. | Montez. | Monomoy. |
|--|---|--|--|--|---|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | \$310.00 | | (1) | | \$5,243.84 |
| 21. Subistence..... | (1) | | | | 1,768.37- |
| 22. Fuel..... | 310.04 | \$31.20 | | \$109.06 | 1,121.63 |
| 23. Supplies (machinery)..... | 17.70 | 3.96 | | 19.79 | 124.98 |
| 24. Repairs: | | | | | |
| (a) Hull..... | 40.07 | | | 22.57 | 71.83 |
| (b) Machinery..... | 124.70 | 15.43 | | 4.46 | 97.64 |
| 25. Additions and alterations..... | | 15.00 | | | |
| 26. Miscellaneous..... | | | | 11.43 | |
| 27. Total..... | \$802.51 | | | \$167.35 | \$9,228.76 |
| 28. Approximate number of miles run during year..... | 3,803 | Unknown. | | 1,568 | 4,318. |
| 29. Number of days in commission..... | 223 | 308 | | 200 | 366. |
| 30. Cost of fuel per gallon..... | 184 to 214 cents. | 24 cents. | | 19 cents. | 14.06 cents. |
| | <i>Remarks.</i>
Inspection work and light-house work in division Burlington, Iowa, to Hannibal, Mo.
1 None. | <i>Remarks.</i>
1 Included in the contract price of and used as power tender to Fruhling-type, sea-going hopper dredge Minniquas and operated by members of her crew. | <i>Remarks.</i>
Not in commission during the year.
1 Not operated. | <i>Remarks.</i>
Operated on the Missouri River (Kansas City to mouth).
Dispatch service and for handling plant and material rafts.
1 No one regularly employed to run the boat. | <i>Remarks.</i>
Transporting officer in charge and assistants on inspection and supervisory trips to and from the different river and harbor and fortification works, and carrying materials and supplies. |

| Name..... | Moore. | Moreau. | McDerry. | Munden. | Murrida. |
|---|--|---------------------------|---|---------------------------|--------------------------|
| 1. District..... | Wheeling, W. Va..... | Kansas City, Mo..... | Mobile, Ala..... | Norfolk, Va..... | First, Portland, Oreg. |
| 2. Where built..... | Bay City, Mich..... | Grafton, Ill..... | Morris Heights, N. Y..... | Roanoke Island, N. C..... | Astoria, Oreg. |
| 3. When built..... | 1913..... | 1910..... | 1911..... | 1913..... | 1913..... |
| 4. Builder..... | Alonso L. Arnold..... | Ripley Steel Boat Co..... | Chas. L. Seabury & Co..... | W. O. Dough..... | Wilson Bros. |
| 5. Time to build..... | 5 months..... | No record..... | Not known..... | 30 days..... | 6 weeks..... |
| 6. Where purchased..... | Bay City, Mich..... | Grafton, Ill..... | Morris Heights, N. Y..... | Manteo, N. C..... | Astoria, Oreg. |
| 7. When purchased..... | 1913..... | 1910..... | 1912..... | 1913..... | 1913..... |
| 8. From whom purchased..... | From whom purchased..... | Ripley Steel Boat Co..... | Same as item No. 4..... | W. O. Dough..... | Wilson Bros. |
| 9. Purchase price..... | | \$388.40..... | \$3,000 f. o. b. Tuscaloosa, Ala..... | \$350..... | \$880..... |
| 10. Contract cost..... | \$3,025..... | | \$3,000..... | | \$880..... |
| 11. Complete cost with outfit..... | \$3,058..... | \$388.50..... | \$3,000..... | \$375..... | \$880..... |
| 12. Present value..... | \$1,000..... | \$225..... | \$1,700..... | \$300..... | \$700..... |
| 13. Hull: | | | | | |
| (a) Material of hull..... | Wood..... | Steel..... | Wood..... | Wood..... | Wood, Port Orford cedar. |
| (b) Length over all..... | 40 feet..... | 20 feet..... | 35 feet..... | 22 feet 6 inches..... | 24 feet..... |
| (c) Length on water line..... | 40 feet..... | No record..... | 34 feet 6 inches..... | 21 feet..... | 24 feet..... |
| (d) Beam over all..... | 8 feet 6 inches..... | 5 feet 1 inch..... | 6 feet 10 inches..... | 6 feet 6 inches..... | 6 feet 5 inches. |
| (e) Beam on water line..... | 8 feet 6 inches..... | 4 feet 5 inches..... | 5 feet 9 inches..... | 5 feet..... | 5 feet 6 inches. |
| (f) Depth of hull forward..... | 5 feet..... | 2 feet 7 inches..... | 4 feet 9 inches..... | 3 feet 6 inches..... | 3 feet..... |
| (g) Depth of hull amidships..... | 4 feet..... | 2 feet 1 inch..... | 3 feet 10 inches..... | 2 feet 6 inches..... | 2 feet 6 inches. |
| (h) Depth of hull aft..... | 3 feet 6 inches..... | 1 foot 7 inches..... | 2 feet 7 inches..... | 2 feet 9 inches..... | 3 feet..... |
| (i) Draft forward..... | 1 foot 4 inches..... | 1 foot..... | 1 foot 3 inches..... | 1 foot 6 inches..... | 1 foot 4 inches. |
| (j) Draft aft..... | 1 foot 6 inches..... | 2 feet..... | 2 feet 6 inches..... | 2 feet..... | 1 foot 4 inches. |
| (k) Draft to bottom of propeller..... | 1 foot 2 inches..... | 1 foot 3 inches..... | 2 feet..... | 2 feet..... | 2 feet..... |
| (l) Depth of keel from bottom of outside of planking..... | 1 inch..... | No keel..... | 2½ inches forward, 1½ inches aft..... | 6 inches..... | 3½ inches. |
| (m) Displacement (long tons)..... | 4..... | 2.6..... | 2.62..... | 1..... | 2.5..... |
| (n) Speed in statute miles per hour..... | 12..... | 7..... | 11..... | 7½..... | 8..... |
| 14. House: | | | | | |
| (a) Length..... | 28 feet..... | None..... | 23 feet..... | None..... | None. |
| (b) Width..... | 7 feet..... | | 5 feet 10 inches..... | | |
| (c) Height above deck..... | 6 feet 4 inches..... | | 3 feet 9 inches above gunwales, 7 feet above floor. | | |
| (d) Accommodations bunka..... | 8 seats, convertible into 2 bunka..... | | Seating capacity for 18 persons..... | | |

TABLE XVII.—Report of operations of gasoline launches (acru) for the calendar year ending Dec. 31, 1916—Continued.

| Name | Monroe. | Morse. | McBerry. | Menden. | Merrill. |
|---|--------------------------------|----------------------|--------------------|---|---------------------------|
| 15. Motors: | | | | | |
| (a) Number..... | 1..... | 1..... | 1..... | 1..... | 1..... |
| (b) Type..... | 4-cycle..... | Marine, Model 8..... | 4-cycle..... | 2-cycle..... | 4-cycle, medium duty..... |
| (c) When built..... | 1913..... | 1910..... | Not known..... | 1913..... | 1913..... |
| (d) Make..... | Niagara Gasoline Motor Co..... | Gray Motor Co..... | Speedway..... | Mianus Motor Works, Stamford, Conn..... | Sterling..... |
| (e) Number of cylinders (one engine)..... | 4..... | 2..... | 4..... | 1..... | 2..... |
| (f) Diameter of cylinder..... | 4½ inches..... | 4½ inches..... | 4½ inches..... | 5½ inches..... | 4½ inches..... |
| (g) Stroke..... | do..... | 4 inches..... | 5 inches..... | 6 inches..... | 6 inches..... |
| (h) Revolutions per minute..... | 630..... | 700..... | 800 to 1,000..... | 450..... | 550..... |
| (i) Rated brake horsepower (total)..... | 40..... | 13..... | 24.1 and 26.7..... | 7½..... | 8..... |
| (j) Weight of one motor..... | 1,550 pounds..... | No record..... | 1,000 pounds..... | 415 pounds..... | 650 pounds..... |
| 16. Propeller: | | | | | |
| (a) Number of blades..... | 3..... | 3..... | 3..... | 3..... | 3..... |
| (b) Diameter..... | 26 inches..... | 16 inches..... | 23 inches..... | 21 inches..... | 20 inches..... |
| (c) Pitch..... | 26 inches..... | 23 inches..... | 20 inches..... | 20 inches..... | Do..... |
| (d) Diameter of shaft..... | 1½ inches..... | 1½ inches..... | 1½ inches..... | 1½ inches..... | 1½ inches..... |
| 17. Heating system: | | | | | |
| (a) Type..... | None..... | None..... | None..... | None..... | None..... |
| (b) Size of heater..... | do..... | do..... | do..... | do..... | do..... |
| (c) Number of radiators..... | do..... | do..... | do..... | do..... | do..... |
| 18. Electric-light plant: | | | | | |
| (a) Make..... | do..... | None..... | do..... | None..... | None..... |
| (b) Type of motor..... | do..... | do..... | do..... | do..... | do..... |
| (c) Brake horsepower..... | do..... | do..... | do..... | do..... | do..... |
| (d) Revolutions per minute..... | do..... | do..... | do..... | do..... | do..... |
| (e) Capacity of generator in kilowatts..... | do..... | do..... | do..... | do..... | do..... |
| (f) Number of lights..... | do..... | do..... | do..... | do..... | do..... |
| (g) A power plant..... | do..... | do..... | do..... | do..... | do..... |
| (h) Diameter of shaft..... | do..... | do..... | do..... | do..... | do..... |
| 19. Number of hours in service..... | 1..... | 1..... | 2..... | 1..... | 1..... |

| OPERATING COST. | | | | | | | |
|--|--|---|---|---|---|--|----------|
| 20. Pay roll..... | \$729.24 | \$19.01 | \$367.23 | \$300.00 | (C) | | |
| 21. Subsistence..... | | 3.24 | 106.46 | 152.70 | 80.00 | | |
| 22. Fuel..... | 533.07 | 4.19 | 430.41 | 30.92 | 10.80 | | |
| 23. Supplies (machinery)..... | 90.30 | .30 | 80.03 | | | | |
| 24. Repairs: | | | | | | | |
| (a) Hull..... | 78.43 | | 10.53 | 30.07 | 2.00 | | |
| (b) Machinery..... | 130.33 | | 102.30 | 30.96 | 9.00 | | |
| 25. Additions and alterations..... | | | 66.00 | 6.62 | | | |
| 26. Miscellaneous..... | 64.19 | 2.10 | 13.35 | 5.70 | | | |
| 27. Total..... | \$1,632.61 | | \$1,127.33 | \$632.96 | | | \$101.80 |
| 28. Approximate number of miles run during year..... | 2,500 | 112 | 3,929 | 1,000 | 1,000 | | |
| 29. Number of days in commission..... | 224 | 7 | 111 | 180 | 306 | | |
| 30. Cost of fuel per gallon..... | 20 and 22 cents. | \$0.138 | \$0.233+ | 24.2 cents | \$0.20 | | |
| | Remarks. | Remarks. | Remarks. | Remarks. | Remarks. | | Remarks. |
| | At Dam No. 21, Ohio River, in connection with construction work. | Operated on Missouri River (attendant to snagboat Mandan, operating between Fort Pierre, S. Dak., and Fort Benton, Mont. Dispatch service and sounding. | This boat was operated on the Black Warrior and Tombigbee Rivers, Ala. Was used as an inspection boat for all work between Lock 4, Tombigbee Rivers, to Sanders Ferry on Mulberry Fork and Nicholas Shoals on Locust Fork. It was also used to deliver supplies to the various locks and to boats on this river, and was used in keeping up repairs on telephone lines. It was also used for towing coal barges and other floating plant. | Operated on inland waterway, Norfolk, Va., to Beaufort Inlet, N. C. | Launch used as tender to dredge Col. P. S. Mohle and on survey work. One man taken from dredge to run launch as required. | | |

TABLE XVII.—*Report of operations of gasoline launches (serew) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Musang. | Myra. | Nancy. | Nanina. | Naseau. |
|--|----------------------------|------------------|--|----------------------------|-------------------------------------|
| 1. District..... | Galveston, Tex. | Rock Island. | Wilmington, N. C. | Wheeling, W. Va. | Jacksonville, Fla. |
| 2. Where built..... | 1916. | 1910. | New York, N. Y. | Louisville, Ky. | Dames Point, Fla. |
| 3. When built..... | U. S. Engineer Department. | United States. | Gas Engine Power Co. and C. L. Seabury Co. | U. S. Engineer Department. | 1916. |
| 4. Builder..... | | | Unknown. | 3 months. | Hired labor: Julius Olsen, foreman. |
| 5. Time to build..... | | 2 months. | New York, N. Y. | | |
| 6. Where purchased..... | | | February 1913. | | |
| 7. When purchased..... | | | Gas Engine Power Co. and C. L. Seabury Co. | | |
| 8. From whom purchased..... | | | \$2,065.25. | | |
| 9. Purchase price..... | \$750. | \$1,500. | \$2,065.25. | \$3,069.53. | \$397.14. |
| 10. Contract cost..... | | | \$2,065.25. | | \$637.1 |
| 11. Complete cost with outfit..... | \$750. | \$432.68. | \$1,400. | | |
| 12. Present value..... | Wood. | Wood. | Wood. | Wood. | Wood. |
| 13. Hull: | 20 feet. | 39 feet. | 30 feet. | 42 feet 5 inches. | 22 feet 91 inches. |
| (a) Material of hull..... | 17 feet 3 inches. | 34 feet. | 27 feet 10 inches. | 40 feet 4 inches. | 22 feet. |
| (b) Length over all..... | 5 feet 9 inches. | 7 feet 6 inches. | 7 feet. | 7 feet 5 inches. | 7 feet 1 inch. |
| (c) Length on water line..... | 5 feet 2 inches. | 5 feet. | 7 feet. | 6 feet 7 inches. | 6 feet 7 inches. |
| (d) Beam over all..... | 4 feet. | 4 feet. | 4 feet. | 3 feet. | 3 feet 10 inches. |
| (e) Beam on water line..... | 2 feet 5 inches. | 2 feet 8 inches. | 3 feet. | 3 feet 11½ inches. | 2 feet 7½ inches. |
| (f) Depth of hull forward..... | 2 feet. | 2 feet 8 inches. | 3 feet 5 inches. | 3 feet 8½ inches. | 2 feet 1 inch. |
| (g) Depth of hull aft..... | 1 foot 8 inches. | 1 foot 3 inches. | 1 foot 9 inches. | 2 feet. | 1 foot. |
| (h) Draft forward..... | 1 foot 11 inches. | 10 inches. | 3 feet. | 2 feet 3 inches. | 2 feet 5 inches. |
| (i) Draft aft..... | 1 foot 11 inches. | 2 feet 9 inches. | 2 feet 6 inches. | 4 feet 6 inches. | 2 feet 3 inches. |
| (j) Draft to bottom of propeller..... | 4 inches. | 4½ inches. | 4½ inches. | 1 foot 7 inches. | 1½ inches. |
| (k) Depth of keel from bottom of outside of planing..... | 24 tons. | 7½. | 7½. | 6. | 1.2 tons. |
| (m) Displacement (long tons). | 10½. | 8. | 8. | 12 to 14. | 9. |
| (n) Speed in statute miles per hour. | 4 feet. | 13 feet. | 11 feet 7 inches. | 25 feet 7 inches. | 7 feet. |
| (a) Length..... | 4 feet 11 inches. | 6½ feet. | 6 feet 5 inches. | 49 inches. | 5 feet 5 inches. |
| (b) Width..... | 1 foot 5 inches. | 3 feet. | 3 feet. | | 3 feet. |
| (c) Masts above deck..... | | | | | |
| 14. House: | | | | | |

| (4) Accommodations None..... | | House built principally to protect engine. No sleeping accommodations. | | No seats or bunks..... | | Fired seats. | |
|--|------------|--|-----------------|-------------------------------------|---------------------------|--------------|--|
| 15. Motors:
(a) Number.....
(b) Type.....
(c) When built.....
(d) Make.....
(e) Number of cylinders (one engine).
(f) Diameter of cylinder.
(g) Stroke.....
(h) Revolutions per minute.
(i) Rated brake horsepower (total).
(j) Weight of one motor. | 1. | 4-cycle. | 1. | Gasoline, 4-cycle, 6-cylinder. | 1. | 4-cycle. | |
| | 1915. | | 1916. | 1911. | No record. | | |
| | Red Wing. | Lamb Boat & Engine Co., Clinton, Iowa. | Lamb Engine Co. | Lamb Boat & Engine Co. | Peerless Marine Motor Co. | | |
| | 4. | | 2. | 6. | | 2. | |
| | 4½ inches. | 6½ inches. | 4½ inches. | 6½ inches. | 6 inches. | 5 inches. | |
| | 5 inches. | 6 inches. | 6½ inches. | 7 inches. | 8 inches. | 6 inches. | |
| | 880. | 450 to 500. | 450. | 450. | 580. | 580. | |
| | 28 to 30. | 12. | 15. | 60. | 12 to 16. | 12 to 16. | |
| | 550. | 825 pounds. | 850 pounds. | 2,400 pounds. | 500 pounds. | 500 pounds. | |
| | 3. | 3. | 3. | 3. | 3. | 3. | |
| 16. Propeller:
(a) Number of blades.....
(b) Diameter.....
(c) Pitch.....
(d) Diameter of shaft. | 16 inches. | 20 inches. | 22 inches. | 30 inches. | 20 inches. | 20 inches. | |
| | 22 inches. | do. | do. | 32 inches. | 24 inches. | 24 inches. | |
| | 1½ inches. | 1½ inches. | 1½ inches. | Main 2½ inches, propeller 2 inches. | 1½ inches. | 1½ inches. | |
| 17. Heating system:
(a) Type.....
(b) Size of heater.
(c) Number of radiators. | None. | None. | None. | None. | None. | None. | |
| 18. Electric-light plant:
(a) Make.....
(b) Type of motor.....
(c) Brake horsepower.
(d) Revolutions per minute.
(e) Capacity of generator in kilowatts. | None. | None. | None. | None. | None. | None. | |
| (f) Number of lights. | | | | | | | |
| (g) Average candle-power per light. | | | | | | | |
| (h) Diameter of searchlight. | | | | | | | |
| 19 Number of men in crew | 1. | | 2. | 1. | | 1. | |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Mustang. | Myra. | Nancy. | Nantine. | Nassau. |
|-------------------------------|--------------------------|--------------------------------|------------------------------|----------------------------|--------------------------------|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | \$945.00 | ..... | \$300.00 | \$5.00 | \$315.00 |
| 21. Substenance..... | 137.98 | ..... | 177.95 | 270.64 | (1) 96.64 |
| 22. Fuel..... | 648.07 | ..... | 51.99 | 53.01 | 23.75 |
| 23. Supplies (machinery) .. | 72.15 | ..... |  |  |  |
| 24. Repairs: | | | | | |
| (a) Hull..... | 44.37 | } \$66.88 | 525.30 | 5.40 | 16.75 |
| (b) Machinery..... | 82.49 | | 154.72 | 355.05 | \$ 367.50 |
| 25. Additions and altera- | 127.62 | ..... | 479.10 | ..... |  |
| tions..... | | | 1.20 | 2.86 | 23.40 |
| 26. Miscellaneous..... | 45.25 | ..... |  |  |  |
| 27. Total..... | \$1,622.93 | No record kept..... | \$1,690.26 | \$621.96 | \$842.04 |
| 28. Approximate number | | | 1,000..... | 544..... | 1,541. |
| of miles run during | | | | | |
| year..... | | do..... | 205..... | 131..... | 200. |
| 29. Number of days in | | do..... | | 23 cents (average)..... | 18½ cents. |
| commission. | | | | | |
| 30. Cost of fuel per gallon.. | | | | | |
| | Remarks. | Remarks. | Remarks. | Remarks. | Remarks. |
| | Tender for dredge Com- | Operated on Milan sec- | This launch is used by | On Kanawha River in | Survey boat on St. Johns |
| | stock. Placed in commis- | tion, Illinois and Mississippi | survey party; not in con- | connection with derrick | River and channel between |
| | sion in June. | anal. Work started around | stant use. There are no | boat (apt. Turtle, and on | St. Johns River to (umber- |
| | | United States boat yard, | provisions on the launch for | Ohio River transferring | land Sound, Ga. and Fla. |
| | | Milan, Ill. | subsisting on the crew. | boats and supplies at Dams | 1 Subsistence furnished by |
| | | | The housing has been re- | No. 12 and 13. | St. Johns River survey |
| | | | built, hull lined inside and | | party. |
| | | | new engine installed during | | A new 12-horsepower Re- |
| | | | November and December, | | gal engine was purchased and |
| | | | 1916. | | installed in place of the sec- |
| | | | | | ondhand Miami engine |
| | | | | | which was installed when |
| | | | | | the boat was built and which |
| | | | | | became unserviceable in a |
| | | | | | short time. |

| Name..... | Neches. | Nehalem. | Nazi. | Nemadji. | Neptuna. |
|--|-------------------|--------------------------|---------------------------|-------------------------|---|
| 1. District..... | Dallas, Tex. | First, Portland, Oreg. | Cincinnati, Ohio (first). | Duluth, Minn. | New Orleans (fourth Mississippi River). |
| 2. Where built..... | Salem, Ohio. | | G'raecaster City, N. J. | Racine, Wis. | New Orleans, La. |
| 3. Built by..... | W. H. Mullins Co. | | 1893. | 1912. | 1913. |
| 4. Built for..... | 1 month. | | Clay & Tortensen. | Farline Boat Co. | Fetter & Son. |
| 5. Time to build..... | | | Unknown. | 7 months. | 2 months. |
| 6. Where purchased..... | | Nehalem, Oreg. | G'raecaster City, N. J. | | New Orleans, La. |
| 7. When purchased..... | Mar. 15, 1916. | | 1893. | | 1913. |
| 8. From whom purchased..... | Albert Crawford. | | Clay & Tortensen. | | Stauffer, Kahleman & Co. |
| 9. Purchase price..... | \$725. | | \$1,102.50. | | \$1,300. |
| 10. Current cost..... | \$1,581.25. | | \$1,102.50. | | \$1,300. |
| 11. Complete cost with outfit..... | \$1,581.25. | | \$1,102.50. | | \$1,300. |
| 12. Present value..... | \$900. | | \$50. | | \$1,550. |
| 13. Hull: | | | | | |
| (a) Material of hull..... | Galvanized steel. | Wood, Port Orford cedar. | Wood. | Wood. | Wood. |
| (b) Length over all..... | 28 feet. | 30 feet. | 25 feet. | 60 feet 9 inches. | 32 feet. |
| (c) Length on water line..... | 25 feet. | 28 feet. | 22 feet 3 inches. | 55 feet 10 inches. | 32 feet. |
| (d) Beam over all..... | 6 feet. | 8 feet 9 inches. | 5 feet 11 inches. | 12 feet. | 5 feet 4 inches. |
| (e) Beam on water line..... | 4 feet 9 inches. | 7 feet 3 inches. | 5 feet 7 inches. | 11 feet 5 inches. | 5 feet 2 inches. |
| (f) Depth of hull forward..... | 2 feet 8 inches. | 3 feet 6 inches. | 3 feet 11 inches. | 7 feet. | 4 feet 4 inches. |
| (g) Depth of hull amidships..... | 2 feet 4 inches. | 3 feet. | 2 feet 10 inches. | 6 feet 2 inches. | 3 feet 6 inches. |
| (h) Depth of hull aft..... | 1 foot 7 inches. | 3 feet. | 3 feet 10 inches. | 5 feet 9 inches. | 2 feet. |
| (i) Draft forward..... | 4 inches. | 2 feet. | 1 foot 4 inches. | 3 feet 6 inches. | 1 foot 6 inches. |
| (j) Draft aft..... | 6 inches. | 2 feet 4 inches. | 1 foot 10 inches. | 4 feet. | 4 inches. |
| (k) Draft to bottom..... | 2 feet. | 2 feet 2 inches. | 1 foot 5 inches. | 3 feet 8 inches. | 2 feet 2 inches. |
| (l) Draft of propeller..... | 24 inches. | 2 inches. | 23 inches. | 8 inches. | 14 inches. |
| (m) Displacement (long tons)..... | 1.1. | 5. | 1.50. | 20. | 3.3. |
| (n) Speed in statute miles per hour..... | 14. | 7. | 10. | 12 maximum. | 22. |
| 14. Horses: | | | | | |
| (a) Length..... | 11 feet. | 11 feet. | 13 feet (pl' of house). | 13 feet (pl' of house). | 13 feet canopy top. |
| (b) Width..... | 8 feet. | 8 feet. | 7 feet (pl' of house). | 7 feet (pl' of house). | 5 feet 1 inch. |
| (c) Height above deck..... | 3 feet 3 inches. | 3 feet 3 inches. | 30. | 30. | 3 feet 6 inches. |
| (d) Accommodations..... | Seats only. | Seats only. | 4 persons. | 4 persons. | 8 persons. |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name | Neches. | Nehalem. | Nell. | Nemadji. | Neptuna. |
|---|--------------|---------------------------|-------------|---|----------------------|
| 15. Motors: | | | | | |
| (a) Number | 1. | 1. | 1. | 1. | 1. |
| (b) Type | 4-cycle. | 4-cycle. | 2-cycle. | 4-cycle gasoline. | 4-cycle, high speed. |
| (c) When built | 1914 | 1914 | 1909 | 1912 | 1913 |
| (d) Make | Fay & Bowen. | Standard (San Francisco). | Ferro. | Standard Motor Construction Co. | Sterling Engine Co. |
| (e) Number of cylinders (one engine). | 4. | 2. | 2. | 6. | 4. |
| (f) Diameter of cylinder. | 4½ inches. | 4½ inches. | 5 inches. | 5½ inches. | 5½ inches. |
| (g) Stroke. | 6 inches. | 5½ inches. | do. | 11 inches. | 6 inches. |
| (h) Revolutions per minute. | 1,000. | 440. | 700. | 392. | 1,200. |
| (i) Rated brake horsepower (total). | 20 to 35. | 8. | 15. | 123 for 250 revolutions per minute. | 30 to 50. |
| (j) Weight of one motor. | 700 pounds. | 1,000 pounds. | 474 pounds. | 7,800 pounds. | 900 pounds. |
| 16. Propeller: | | | | | |
| (a) Number of blades. | 3. | 3. | 3. | 3 to 11 inches wide. | 3. |
| (b) Diameter. | 18 inches. | 21 inches. | 18 inches. | 40 inches. | 1 foot 6 inches. |
| (c) Pitch. | 26 inches. | do. | 24 inches. | 3 feet 2 inches. | 34 inches. |
| (d) Diameter of shaft. | 1½ inches. | 1½ inches. | 1½ inches. | 3 inches. | 1½ inches. |
| 17. Heating system: | | | | | |
| (a) Type. | None. | None. | None. | Hot water. | None. |
| (b) Size of heater. | | | | 12 inches diameter of grate. | |
| (c) Number of radiators. | | | | 3. | |
| 18. Electric-light plant: | | | | | |
| (a) Make. | | None. | | Dayton Electrical Manufacturing Co. | None. |
| (b) Type of motor. | | | | Current for storage battery at all times. | |
| (c) Brake horsepower. | | | | 0.34. | |
| (d) Revolutions per minute. | | | | 1,800. | |
| (e) Capacity of generator in kilowatts. | | | | 0.26. | |
| (f) Number of | | | | 14 of 6 candlepower; 1 searchlight; 50 candlepower. | |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name | Remarks. | Name. | New Quilt. | Modn. | Note. |
|---|-------------------------------|---------------------------|------------|---|-------------------------------------|
| 1. District. | | | | | |
| 2. Where built. | Detroit, Mich. (lake survey). | Philadelphia, Pa. | | St. Paul, Minn. | Honolulu, Hawaii. |
| 3. When built. | New York City. | Penns Grove, N. J. | | 1915. | Seattle, Wash. |
| 4. Builder. | Not known. | March 1912. | | Jos. Dingle Boat Works. | May 1911. |
| 5. Time to build. | d. | 3 weeks. | | St. Paul, Minn. | Markley & Wilson. |
| 6. Where purchased. | Sault Ste. Marie, Mich. | 7 m. mths. | | Aug. 7, 1912. | 3 m. mths. |
| 7. When purchased. | 1916. | New Castle, Del. | | May 1915. | Seattle, Wash. |
| 8. For what purchased. | Ella J. Farnhise. | Walter Wipf. | | Jos. Dingle Boat Works. | May 1911. |
| 9. Purchase price. | \$1,077.35. | | | \$278. | Markley & Wilson. |
| 10. Contract cost. | | | | \$278. | \$28.30. |
| 11. Complete cost with outfit. | | | | \$1,186.95. | \$3,010. |
| 12. Present value. | \$1,000. | | | \$678. | \$2,000. |
| 13. Hull: | | | | | |
| (a) Material of hull. | Wood. | Wood. | | Wood. | Wood, copper sheathed. |
| (b) Length over all. | 37 feet. | 24 feet 6 inches. | | 30 feet 3 inches. | 35 feet. |
| (c) Length on water line. | 34 feet 6 inches. | 23 feet 6 inches. | | 30 feet 3 inches. | 32 feet 6 inches. |
| (d) Beam over all. | 7 feet 4 inches. | 7 feet. | | 5 feet 8 inches. | 7 feet 6 inches over all. |
| (e) Beam on water line. | 6 feet 9 inches. | 5 feet 8 inches. | | 5 feet 3 inches. | 6 feet. |
| (f) Depth of hull forward. | 5 feet 6 inches. | 3 feet. | | 2 feet 10 inches. | 4 feet 6 inches. |
| (g) Depth of hull amidships. | 6 feet 6 inches. | 2 feet 8 inches. | | 2 feet 8 inches. | 4 feet. |
| (h) Depth of hull aft. | 3 feet. | 5 feet. | | 2 feet. | 1 foot 8 inches. |
| (i) Draft forward. | 1 foot 9 inches. | 3 feet 11 inches. | | 8 inches. | 1 foot 6 inches. |
| (j) Draft aft. | 4 feet. | 3 feet 11 inches. | | 6 inches. | 2 feet 3 inches. |
| (k) Draft to bottom of propeller. | 3 feet 9 inches. | 2 feet 8 inches. | | 2 feet 1 inch. | 3 feet 2 inches. |
| (l) Depth of keel from bottom of outside of planking. | 4 inches. | 2 inches. | | 2 inches. | 7 inches amidship. |
| (m) Displacement (l. wt. n.). | 10. | 1.5. | | 1. | 8.5. |
| (n) Speed in statute miles per hour. | 8. | 10. | | 12. | 9. |
| 14. House: | | | | | |
| (a) Length. | 22 feet. | 10 feet. | | 11 feet 2 inches (cockpit with canvas top). | None; open cockpit with spray hood. |
| (b) Width. | 7 feet 3 inches. | 8 feet. | | 4 feet 9 inches. | |
| (c) Height above deck. | 6 feet 8 inches. | 6 feet 8 inches over all. | | 6 feet 3 inches. | |
| (d) Accommodations. | 4 berths, toilet, and sink. | 9. | | Boats 9 passengers. | 10 passengers. |

| | | | | | |
|--|---|------------|--------------------------|--------------------|------------------------------------|
| 15. Motors: | (a) Number..... | 1..... | 1..... | 1..... | 1..... |
| | (b) Type..... | 2-cycle. | 4-cycle. | Gasoline, 4-cycle. | 4-cylinder, 4-cycle. |
| (c) When built..... | (d) Make..... | Not known. | 1916. | 1912. | 1914. |
| | | Ferro. | Sterling Engine Co. | Harris Engine Co. | Auto Engine Works, St. Paul, Minn. |
| (e) Number of cylinders (one ender of cylinder)..... | (f) Diameter of cylinder..... | 5 inches. | 64 inches. | 5 inches. | 31 inches. |
| | (g) Stroke..... | 6 inches. | 9 inches. | 54 inches. | 64 inches. |
| (h) Revolutions per minute..... | (i) Rated brake horsepower (total)..... | 650. | 400. | 400. | 800. |
| | (j) Weight of one motor..... | 25. | 71. | 8. | 20. |
| 16. Propeller: | (a) Number of blades..... | | 4,182 pounds. | 450 pounds. | 555 pounds. |
| | (b) Diameter..... | 22 inches. | 34 inches. | 22 inches. | 17 inches. |
| (c) Pitch..... | (d) Diameter of shaft..... | 30 inches. | 35 inches. | 30 inches. | 20 inches. |
| | (e) Heating system: | 14 inches. | 24 inches. | 11 inches. | 1 inch. |
| (a) Type..... | (b) Size of heater..... | None. | American Radiator Co. | | No heating system. |
| | (c) Number of radiators..... | | 14 inches by 30 inches. | | None. |
| 18. Electric-light plant: | (a) Make..... | None. | General Electric Co. | | No electric-light plant. |
| | (b) Type of motor..... | | 2-cycle gasoline engine. | | |
| (c) Brake horsepower..... | (d) Revolutions per minute..... | | 2 horsepower. | | |
| | (e) Capacity of generator in kilowatts..... | | 1,200. | | |
| (f) Number of lights..... | (g) Average candle-power per light..... | | 30. | | |
| | (h) Diameter of searchlight..... | | 48 inches. | | |
| 19. Number of men in crew..... | | 2. | | No regular crew. | 1. |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Netmotors. | Newse. | New Castle. | Nodin. | Nola. |
|--|--|--|--|-------------------------------------|--|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | \$441.25 | \$2,437.00 | ..... | \$70.00 | \$300.00 |
| 21. Subsistence..... | ..... | 803.06 | ..... | 12.53 | ..... |
| 22. Fuel..... | 611.09 | 1,845.83 | \$57.00 | 20.00 | 34.80 |
| 23. Supplies (machinery)..... | 73.65 | 1,279.54 | 9.67 | 10.00 | 31.85 |
| 24. Repairs: | | | | | |
| (a) Hull..... | 57.25 | 107.72 | ..... | 20.40 | 33.13 |
| (b) Machinery..... | 72.22 | 125.74 | 10.00 | 48.12 | 79.21 |
| 25. Additions and alterations..... | ..... | 429.56 | ..... | ..... | ..... |
| 26. Miscellaneous..... | 116.49 | 159.34 | 3.10 | ..... | 14.53 |
| 27. Total..... | \$1,272.95 | ..... | ..... | \$181.45 | \$498.52 |
| 28. Approximate number of miles run during year..... | 155..... | 5,953..... | 1,600..... | 1,479..... | 1,600..... |
| 29. Number of days in commission..... | 20½ cents..... | 306..... | 240..... | 155..... | 210..... |
| 30. Cost of fuel per gallon..... | ..... | ..... | 22 cents, average..... | 10 cents..... | 17.4 cents..... |
| | Remarks. | Remarks. | Remarks. | Remarks. | Remarks. |
| | On hydrographic survey of Lake of the Woods. | Operated on various rivers and harbors in the Newbern, N. C., subdistrict. | In Delaware River below Philadelphia, Pa., as a tender to the pipe-line hydraulic dredge Cataract. | Mississippi and Leech Rivers, Minn. | Honolulu Harbor, Hawaii. Crew used for the greater part of the time as a member of survey party. |

| Name..... | Porta. | Nova. | Nueces. | Obion. | Ochs. |
|---|--------------------------------|------------------------|--------------------------------|---|------------------------|
| 1. District..... | Portland, Me..... | Norfolk, Va..... | Galveston, Tex..... | St. Louis, Mo., Mississippi River Commission. | First, Portland, Oreg. |
| 2. Where built..... | New York City..... | do..... | St. Louis, Mo..... | Grafton, Ill..... | Portland, Oreg. |
| 3. When built..... | 1905..... | 1912..... | 1915..... | September, 1913..... | 1906..... |
| 4. Builder..... | Williams & Whitelaw Co..... | The Wallace Bros..... | St. Louis Yacht & Boat Co..... | Peter Freiman..... | O. P. Graham. |
| 5. Time to build..... | About 4 months..... | 3 months..... | St. Louis Yacht & Boat Co..... | 2 months..... | Portland, Oreg. |
| 6. Where purchased..... | New York City..... | Norfolk, Va..... | St. Louis, Mo..... | Grafton, Ill..... | 1908..... |
| 7. When purchased..... | 1905..... | June, 1912..... | 1915..... | 1913..... | O. P. Graham. |
| 8. From whom purchased..... | Contractors..... | The Wallace Bros..... | St. Louis Yacht & Boat Co..... | Peter Freiman..... | \$1,500. |
| 9. Purchase price..... | \$12,500..... | \$2,138.75..... | \$3,050..... | \$333.75..... | \$1,500. |
| 10. Contract cost..... | Complete cost with outfit..... | \$12,500..... | \$3,000..... | \$333.75..... | \$900. |
| 11. Present value..... | \$5,000..... | \$1,200..... | \$3,000..... | \$295..... | Wood, cedar. |
| 12. Hull: | Wood..... | Wood..... | Wood..... | Wood..... | 30 feet. |
| (a) Material of hull..... | 67 feet..... | 34 feet 10 inches..... | 31 feet..... | 25 feet..... | 30 feet. |
| (b) Length over all..... | 62 feet..... | 36 feet..... | 33 feet 8 inches..... | 24 feet 10 inches..... | 5 feet. |
| (c) Length on water line..... | 14 feet..... | 10 feet 6 inches..... | 8 feet 3 inches..... | 5 feet..... | 5 feet. |
| (d) Beam over all..... | 13 feet..... | 9 feet..... | 8 feet..... | 3 feet 3 inches..... | 5 feet. |
| (e) Beam on water line..... | 7 feet 6 inches..... | 5 feet..... | 5 feet..... | 2 feet..... | 3 feet. |
| (f) Depth of hull forward..... | 7 feet..... | 4 feet 3 inches..... | 3 feet 6 inches..... | 1 foot 11 inches..... | 2 feet 6 inches. |
| (g) Depth of hull amidships..... | 4 feet..... | 2 feet 5 inches..... | 3 feet..... | 1 foot 6 inches..... | 2 feet 2 inches. |
| (h) Depth of hull aft..... | 3 feet 6 inches..... | 2 feet 6 inches..... | 1 foot 10 inches..... | 5 inches..... | 1 foot. |
| (i) Trawl forward..... | 5 feet..... | 3 feet 6 inches..... | 2 feet 1 inch..... | 5 inches..... | 2 feet 2 inches. |
| (j) Trawl aft..... | 3 feet 11 inches..... | 3 feet 4 inches..... | 2 feet 3 inches..... | 1 foot 7 inches..... | 2 feet. |
| (k) Trawl to bottom of propeller..... | About 8 inches..... | 4 inches..... | 10 inches..... | 10 inches..... | 1 inch. |
| (l) Depth of keel from bottom of outside of planking..... | 22..... | 6½..... | 6 tons..... | 0.9..... | 2. |
| (m) Displacement (long tons)..... | 10½..... | 8..... | 15..... | About 8..... | 16. |
| (n) Speed in statute miles per hour..... | 38 feet..... | 15 feet..... | 8 feet..... | 8 feet..... | None. |
| 14. House: | 12 feet 9 inches..... | 8 feet..... | 6 feet..... | 8 inches forward, 12 inches aft..... | |
| (a) Length..... | 2 feet..... | 3.5 and 4.5 feet..... | 8 feet..... | 1 man..... | |
| (b) Width..... | 5 passengers, 4 crew..... | | | | |
| (c) Height above deck..... | | | | | |
| (d) Accommodations..... | | | | | |

TABLE XVII.—*Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Works. | Norma. | Nuclea. | Motors. | Octa. |
|---|------------------------------|--|------------------------------|------------------------------|------------------------------|
| 15. Motors: | | | | | |
| (a) Number..... | 2..... | 1..... | 1..... | 1..... | 1..... |
| (b) Type..... | 4-cycle..... | Automatic, 4-cycle..... | 4-cycle..... | 4-cycle..... | 4-cycle, automotive..... |
| (c) When built..... | 1915..... | 1912..... | 1915..... | 1913..... | 1908..... |
| (d) Make..... | Standard..... | Automatic Machine Co., Bridgeport, Conn..... | Van Dierck Motor Co..... | Missouri Engine Works..... | Sterling..... |
| (e) Number of cylinders (one engine)..... | 4..... | 2..... | 4..... | 2..... | 4..... |
| (f) I diameter of cylinder..... | 6 inches..... | 7½ inches..... | 5½ inches..... | 4½ inches..... | 4½ inches..... |
| (g) Stroke..... | 8 inches..... | 9 inches..... | 8 inches..... | 5 inches..... | 5½ inches..... |
| (h) Revolutions per minute..... | 370 to 400..... | 320..... | 300 to 1,200..... | 500 to 600..... | 500 to 800..... |
| (i) Rated brake horsepower (total)..... | 25 each..... | 25..... | 50 to 65..... | 8..... | 25..... |
| (j) Weight of one motor..... | About 2,000 pounds..... | 2,700 pounds..... | 1,000 pounds..... | 500 pounds..... | 800 pounds..... |
| 16. Propeller: | | | | | |
| (a) Number of blades..... | 3..... | 3..... | 3..... | 3..... | 3..... |
| (b) I diameter..... | 32..... | 20 inches..... | 22 inches..... | 16 inches..... | 18 inches..... |
| (c) Pitch..... | 40..... | 36 inches..... | do..... | 20 inches..... | 27 inches..... |
| (d) I diameter of shaft..... | 11 inches..... | 11 inches..... | 1½ inches..... | 1 inch..... | 1½ inches..... |
| 17. Heating system: | | | | | |
| (a) Type..... | Hot water..... | None..... | None..... | None..... | None..... |
| (b) Size of heater..... | 12-inch grate..... | None..... | None..... | None..... | None..... |
| (c) Number of radiators..... | 7..... | None..... | None..... | None..... | None..... |
| 18. Electric-light plant: | | | | | |
| (a) Make..... | Carlisle & Finch..... | None..... | None..... | None..... | None..... |
| (b) Type of motor..... | 2-cycle, 4-cylinder..... | None..... | None..... | None..... | None..... |
| (c) Brake horsepower..... | About 3½..... | About 3½..... | About 3½..... | About 3½..... | About 3½..... |
| (d) Revolutions per minute..... | 750..... | 750..... | 750..... | 750..... | 750..... |
| (e) Capacity of generator in kilowatts..... | 3 kilowatts..... | 3 kilowatts..... | 3 kilowatts..... | 3 kilowatts..... | 3 kilowatts..... |
| (f) Number of lights..... | 24..... | 24..... | 24..... | 24..... | 24..... |
| (g) Average candle-power per light..... | 8..... | 8..... | 8..... | 8..... | 8..... |
| (h) Diameter of searchlight..... | 14 inches, not in place..... | 14 inches, not in place..... | 14 inches, not in place..... | 14 inches, not in place..... | 14 inches, not in place..... |
| 19. Number of men in crew..... | 4..... | 1..... | 1..... | 1..... | 1..... |

| OPERATING COST. | | | | | | | | | |
|--|--|--|---|--|---|--|--|--|----------|
| 20. Pay roll..... | \$3,545.00 | \$510.00 | \$1,001.00 | \$138.67 | \$50.00 | | | | |
| 21. Substances..... | 270.45 | 91.02 | 131.42 | 55.33 | 12.00 | | | | |
| 22. Fuel..... | 684.97 | 204.15 | 373.11 | | 8.98 | | | | |
| 23. Supplies (machinery) .. | 72.27 | 14.45 | 504.04 | | 18.88 | | | | |
| 24. Repairs: | | | | | | | | | |
| (a) Hull..... | 98.99 | 17.49 | 956.37 | | 561.50 | | | | |
| (b) Machinery..... | 448.22 | 13.81 | 678.88 | | | | | | |
| 25. Additions and alterations. | 43.43 | | 261.92 | | | | | | |
| 26. Miscellaneous..... | 508.93 | 18.19 | 146.24 | | | | | | |
| 27. Total..... | \$5,940.26 | \$869.11 | \$4,038.93 | \$208.91 | | | | | \$646.30 |
| 28. Approximate number of miles run during year. | 3,934..... | 2,682..... | | | 200..... | | | | |
| 29. Number of days in commission. | 366..... | 305..... | | 83..... | 20..... | | | | |
| 30. Cost of fuel per gallon. | 21 cents..... | \$0.22214..... | | | \$0.18..... | | | | |
| | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | | | | |
| | Operated on Portland Harbor and adjacent coast of Maine. Used for inspection duty, transportation of workmen, small supplies, etc. | Operated on Norfolk Harbor, Va., and approaches. | Batteries charged by generator built in engine. | Operated in connection with survey of Aichalaya River. | Employed on upper Columbia River tending drill boat No. 1, carrying supplies running anchor lines, etc. | | | | |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Ottawa. | Ohio. | Ontario. | Osteauville. | Opelika. ¹ |
|--|-------------------------------|---|----------------------------|----------------------------------|---|
| 1. District..... | Norfolk, Va..... | Wilmington, N. C..... | Buffalo, N. Y..... | Montgomery, Ala..... | Mississippi River, first and second districts, Memphis, Tenn..... |
| 2. Where built..... | Camden, N. J..... | Morris Heights, N. Y. ¹ | Oswego, N. Y..... | St. Joseph, Mich..... | Alton, Ill..... |
| 3. When built..... | 1914..... | 1921..... | 1904..... | 1911..... | 1912..... |
| 4. Builder..... | Mathis Yacht Building Co..... | Gas Engine & Power Co and Chas. L. Seabury & Co. (consolidated).
Unknown.
Wilmington, N. C..... | U. S. Engineer Department. | Trusscott Boat Manufacturing Co. | Sparks Engine Co. |
| 5. Time to build..... | 4 months..... | 3 months..... | 3 months..... | ..... | ..... |
| 6. Where purchased..... | Camden, N. J..... | Wilmington, N. C..... | ..... | ..... | ..... |
| 7. When purchased..... | 1914..... | 1905..... | ..... | ..... | ..... |
| 8. From whom purchased..... | Mathis Yacht Building Co..... | ..... | ..... | ..... | ..... |
| 9. Purchase price..... | \$4,305..... | ..... | ..... | ..... | ..... |
| 10. Contract cost..... | \$4,305..... | ..... | ..... | ..... | ..... |
| 11. Complete cost with outfit..... | \$4,305..... | \$1,700..... | \$525..... | ..... | ..... |
| 12. Present value..... | \$8,750..... | \$800..... | \$825..... | ..... | ..... |
| 13. Hull..... | Wood..... | Wood..... | Wood..... | Wood..... | Cypress..... |
| (a) Material of hull..... | 41 feet..... | 34 feet..... | 27 feet..... | 25 feet..... | 60 feet 6 inches..... |
| (b) Length over all..... | 35 feet 6 inches..... | 31 feet..... | 23 feet..... | 25 feet..... | 59 feet..... |
| (c) Length on water line..... | 11 feet 6 inches..... | 8 feet..... | 6 feet 4 inches..... | 6 feet..... | 12 feet 6 inches..... |
| (d) Beam over all..... | 10 feet..... | 7 feet 2 inches..... | 6 feet 5 inches..... | 4 feet 9 inches..... | 11 feet 2 inches..... |
| (e) Beam on water line..... | 6 feet 9 inches..... | 4 feet 9 inches..... | 3 feet 2½ inches..... | 4 feet..... | 5 feet 8 inches..... |
| (f) Depth of hull forward..... | 6 feet..... | 3 feet 2 inches..... | 2 feet 8 inches..... | 3 feet 2 inches..... | 5 feet 3 inches..... |
| (g) Depth of hull amidships..... | 7 feet..... | 4 feet 10 inches..... | 4 feet..... | 1 foot 9 inches..... | 4 feet 4 inches..... |
| (h) Depth of hull aft..... | 2 feet 8 inches..... | 1 foot 3 inches..... | 1 foot 1 inch..... | 1 foot 6 inches..... | 2 feet 6 inches..... |
| (i) Draft forward..... | 3 feet 4 inches..... | 2 feet 4 inches..... | 2 foot 7 inches..... | 1 foot 6 inches..... | 3 feet 7 inches..... |
| (j) Draft aft..... | 3 feet 4 inches..... | 2 feet 2 inches..... | 2 feet 5 inches..... | 1 foot 10 inches..... | 3 feet..... |
| (k) Draft to bottom of propeller..... | 1 foot..... | 2½ inches..... | 1 inch..... | 10 inches..... | 3½ inches..... |
| (l) Depth of keel from bottom of outside ofanking..... | 15..... | 5..... | 1..... | 2..... | 37..... |
| (m) Displacement (long tons)..... | 8..... | 9..... | 8..... | 9..... | 14..... |
| (n) Speed in statute miles per hour..... | ..... | ..... | ..... | ..... | ..... |

| | | | | |
|---|--|---|---|--|
| 14. House: | 18 feet 3 inches
(a) Length.....
6 feet 3 inches.
(b) Width.....
5 feet 9 inches.
(c) Height above
deck.....
2..... | 14 feet.
7 feet.
2½ feet.
2..... | None..... | 46 feet.
10 feet 3 inches.
3 feet 6 inches and 6 feet 6
inches.
6 men. |
| 15. Motors: | | | | |
| (a) Number..... | 1..... | 1..... | 1..... | 2..... |
| (b) Type..... | 4-cycle, heavy duty..... | 4-cycle..... | 2-cylinder, jump spark igni-
tion..... | 4-cycle, vertical marine en-
gines..... |
| (c) When built..... | 1914..... | 1910..... | 1914..... | 1912..... |
| (d) Make..... | Globe..... | Lamb..... | Gray Motor Co., Detroit,
Mich..... | Lippert Bros., St. Louis, Mo..... |
| (e) Number of cylin-
ders (engine)..... | 4..... | 3..... | 2..... | 6..... |
| (f) Diameter of
cylinder..... | 7 inches..... | 5½ inches..... | 4½ inches..... | 6 inches..... |
| (g) Stroke..... | 10 inches..... | 6 inches..... | 4 inches..... | 8 inches..... |
| (h) Revolutions per
minute..... | 330..... | 500..... | 600..... | 400 rated; actual working, 560
to 600. |
| (i) Rated brake
horsepower..... | 35..... | 18..... | 14..... | 120 rated. |
| (j) Weight of motor
(total)..... | 4,300 pounds..... | 1,000 pounds..... | 373 pounds..... | 2,200 pounds..... |
| 16. Propeller: | | | | |
| (a) Number of blades..... | 3..... | 3..... | 3..... | 3..... |
| (b) Diameter..... | 36 inches..... | 22 inches..... | 18 inches..... | 26 inches..... |
| (c) Pitch..... | 30 inches..... | 27 inches..... | Not known..... | 39 inches..... |
| (d) Diameter of shaft..... | 2 inches..... | 1½ inches..... | 1½ inches..... | 1½ inches..... |
| 17. Heating system: | | | | |
| (a) Type..... | | | | Hot water with forced circula-
tion..... |
| (b) Size of heater..... | | | | 15 inches, rated 325 square
feet radiation. |
| (c) Number of radia-
tors..... | | | | 6 rated at 150 square feet. |
| 18. Electric-light plant: | | | | |
| (a) Make..... | | | | Carlyle & Finch Co..... |
| (b) Type of motor..... | | | | 4-cycle, 1 cylinder, direct-
current motor. |
| (c) Brake horse-
power..... | | | | 4..... |
| (d) Revolutions per
minute..... | | | | 750..... |
| (e) Capacity of gen-
erator in kilo-
watts..... | | | | 1 kilowatt, 60 volts. |
| (f) Number of lights..... | | | | 16..... |
| (g) Average candle-
power per light..... | | | | 8..... |
| (h) Diameter of
searchlight..... | | | | 9 inches..... |
| 19. Number of men in crew: | 2..... | 1..... | 1..... | 3..... |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Oltako. | Oltice. | Ontario. | Oostenaula. | Opelika. ¹ |
|--|--|--|--|---|--|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | \$442.67 | (1) | \$442.33 | \$199.07 | \$3,045.00 |
| 21. Subsistence..... | | (1) | | 54.34 | 54.34 |
| 22. Fuel..... | 629.98 | | 59.30 | 106.68 | 1,584.08 |
| 23. Supplies (machinery)..... | 69.86 | | 11.81 | 9.60 | 146.18 |
| 24. Repairs:..... | | | | | |
| (a) Hull..... | 309.73 | | 62.31 | 5.03 | 201.90 |
| (b) Machinery..... | 119.17 | | 26.75 | 91.90 | 621.00 |
| 25. Additions and alterations..... | | | | | |
| 26. Miscellaneous..... | .25 | | | 1.40 | 4.95 |
| 27. Total..... | \$1,571.66 | | \$609.50 | \$458.37 | \$5,983.81 |
| 28. Approximate number of miles run during year..... | 3,642 | | 1,000 | 1,850 | 4,613. |
| 29. Number of days in commission..... | 304 | | 199 | 155 | 366. |
| 30. Cost of fuel per gallon..... | 24.2 cents. | | 24 cents. | \$0.245. | 8,877 gallons from 11½ to 21 cents; average, 17.9 cents. |
| | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> |
| | Operated on inland waterway, Norfolk Va., to Beaufort Inlet, N. C. | Operated on various rivers and harbors in the Newbern (N. C.) subdistrict as tender to dredge Creators.
* Rebuilt in Morehead City in 1913. | Launch was operated at Oswego Harbor, N. Y., in connection with work at that harbor. | From Jan. 1, 1916, to Nov. 1, 1916, this launch was operated between Rome, Ga., and took at Mayes Bay, Ga., and from Nov. 1, 1916, to Dec. 31, 1916, between Locks Nos. 1 and 3, Alabama, hauling miscellaneous supplies. | ¹ Formerly Santa Claus of port of St. Louis. Used for inspection service. |

| Name..... | Oaker. | Ornel. | Ouchlia. | Palacios. | Palouse. |
|--|--|---------------------------------|-------------------------------------|--------------------------------|----------------------------|
| 1. Dietri t..... | Duluth, Minn..... | Seattle, Wash..... | Wicksburg, Miss..... | Galveston, Tex..... | First, Portland, Oreg. |
| 2. Where built..... | Upper canal, Keweenaw Waterway, Mich..... | Winslow, Wash..... | Charleston, W. Va..... |do..... | Portland, Oreg. |
| 3. When built..... | 1912..... | James W. Hall..... | 1907..... | 1916..... | 1907, rebuilt in 1914. |
| 4. Builder..... | W. W. Van Patten..... | 10 months..... | Charles Ward Engineering Works..... | U. S. Engineer Department..... | U. S. Engineer Department. |
| 5. Time to build..... | About 6 months..... | ..... | Not known..... | 3 months..... | 2 months. |
| 6. Where purchased..... | Houghton, Mich..... | ..... | Charleston, W. Va..... | ..... | Portland, Oreg. |
| 7. When purchased..... | 1916..... | ..... | 1903..... | ..... | 1907. |
| 8. From whom purchased..... | W. W. Van Patten..... | ..... | Charles Ward Engineering Works..... | ..... | ..... |
| 9. Purchase price..... | \$250..... | ..... | \$5,400..... | ..... | ..... |
| 10. Centra t cost..... | ..... | \$29,731.50..... | \$10,000..... | \$1,492.44..... | \$2,150. |
| 11. Complete cost with out- f t..... | ..... | \$30,500..... | Not known..... | ..... | ..... |
| 12. Present value..... | \$250..... | ..... | \$2,500..... | \$1,400..... | \$1,000. |
| 13. Hull: | Wood..... | Wood..... | Steel..... | Wood..... | Wood, cedar. |
| (a) Material of hull..... | 20 feet..... | 70 feet 6 inches..... | 65 feet 6 inches..... | 24 feet 6 inches..... | 27 feet 9 inches. |
| (b) Length over all..... | 20 feet..... | 64 feet 2 inches..... | 53 feet..... | 19 feet 10 inches..... | 27 feet 4 inches. |
| (c) Length on water line..... | ..... | ..... | ..... | ..... | ..... |
| (d) Beam over all..... | 5 feet 1 in- h..... | 15 feet..... | 12 feet 6 inches..... | 7 feet..... | 4 feet 8 inches. |
| (e) Beam on water line..... | 4 feet 9 inches..... | 13 feet 10 inches..... | 10 feet 5 inches..... | 6 feet 6 inches..... | 4 feet 6 inches. |
| (f) Depth of hull forward..... | 3 feet..... | 11 feet 3 inches..... | 4 feet 9 inches..... | 5 feet 6 inches..... | 4 feet. |
| (g) Depth of hull amidships..... | 2 feet 9 inches..... | 8 feet 3 inches..... | 4 feet..... | 5 feet 10 inches..... | 2 feet 9 inches. |
| (h) Depth of hull aft..... | 2 feet 11 inches..... | 8 feet 3 inches..... | 3 feet..... | 1 foot 6 in- ches..... | 2 feet. |
| (i) Draft forward..... | 10 in- ches..... | 4 feet..... | 1 foot 5 in- ches..... | 1 foot 9 inches..... | 1 foot. |
| (j) Draft aft..... | 1 foot 11 inches..... | 4 feet 3 in- ches..... | 2 feet 3 in- ches..... | 3 feet..... | 2 feet. |
| (k) Draft to bottom of propeller..... | 1 foot 10 inches..... | 3 feet 8 in- ches..... | 2 feet 4 in- ches..... | 2 feet 8 inches..... | 1 foot 10 inches. |
| (l) Depth of keel amidships; 2 inches forward..... | 1 foot 3 in- ches aft; 5 in- ches amidships; 2 inches forward..... | 6 inches..... | Has no keel..... | 1 foot 2 inches..... | 1 inch. |
| (m) Displacement (long tons)..... | About 14..... | 48..... | 17..... | 3..... | 2. |
| (n) Speed in statute miles per hour..... | 8..... | 10.2..... | 71..... | 81..... | 15. |
| 14. Hairs: | ..... | ..... | ..... | ..... | ..... |
| (a) Length..... | ..... | 33 feet..... | 45 feet..... | Raised deck..... | None. |
| (b) Width..... | ..... | 10 feet 4 in- ches..... | 9 feet..... | ..... | ..... |
| (c) Height above deck..... | None..... | 7 feet and 2 feet 4 inches..... | 4 feet 9 inches..... | ..... | ..... |
| (d) Accommodations..... | ..... | 10..... | 7..... | None..... | ..... |

TABLE XVII.—*Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Order..... | Orcas..... | Ouachita..... | Palacios..... | Palouse..... |
|---|------------------------------------|------------------------|--------------------------------------|-----------------------|----------------------|
| 15. Motors: | | | | | |
| (a) Number..... | 1..... | 2..... | 1..... | 1..... | 1..... |
| (b) Type..... | Double cylinder, 2-cycle gasoline. | Medium duty. | Marine, 4-cycle. | 4-cycle, medium duty. | 4-cycle, automarine. |
| (c) When built..... | 1912. | 1912. | 1909. | 1915. | 1907. |
| (d) Make..... | Fox. | Standard Eastern. | Automatic Machine Co. | Lamb Engine Co. | Standard Eastern. |
| (e) Number of cylinders (one engine). | 2..... | 6..... | 4..... | 4..... | 4..... |
| (f) Diameter of cylinder..... | 3½ inches. | 6 inches. | 7½ inches. | 5½ inches. | 4 inches. |
| (g) Stroke..... | 5 inches. | 8 inches. | 9 inches. | 6 inches. | 5½ inches. |
| (h) Revolutions per minute. | 700 to 1,000. | 400. | 380. | 600. | 600 to 900. |
| (i) Rated brake horsepower (total). | 7..... | 40 to 50. | 50. | 24. | 25. |
| (j) Weight of one motor. | 140 pounds. | 4,000 pounds. | 5,000 pounds. | 1,180 pounds. | 550 pounds. |
| 16. Propeller: | | | | | |
| (a) Number of blades. | 3..... | 4..... | 3..... | 3..... | 3..... |
| (b) Diameter..... | 12 inches. | 35 inches. | 28 inches. | 24 inches. | 18 inches. |
| (c) Pitch..... | 16 inches. | 3½ inches. | 5½ inches. | 30 inches. | 28 inches. |
| (d) Diameter of shaft. | 1½ inches. | 1½ inches. | 2 inches. | 1½ inches. | 1½ inches. |
| 17. Heating system: | | | | | |
| (a) Type..... | None. | (Surface burner. | Stove (coal). | None. | None. |
| (b) Size of heater. | None. | 13 by 19 by 35 inches. | | | |
| (c) Number of radiators. | 8..... | 8..... | | | |
| 18. Electric-light plant: | | | | | |
| (a) Make..... | Standard Eastern. | Standard Eastern. | Dayton Dynamo Co. | None. | Do. |
| (b) Type of motor..... | C and C. | C and C. | Bipolar with 4-cell storage battery. | | |
| (c) Brake horsepower. | 4..... | 4..... | One-third. | | |
| (d) Revolutions per minute. | 700. | 700. | 1,300. | | |
| (e) Capacity of generator in kilowatts. | 2½ kilowatts. | 2½ kilowatts. | One-fourth. | | |
| (f) Number of lights. | None. | 32. | 15. | | |

FLOATING PLANT.

4607

| (6) Average candle-power per light. | | (7) Diameter of searchlight. | | 10..... | | 8..... | | 1..... | |
|--|-----------------|---|--|---|--|---|--|--|--|
| 19. Number of men in crew. | | 9) inches | | None..... | | 2..... |  | ..... |  |
| OPERATING COST. | | 4..... |  | ..... |  | ..... |  | ..... |  |
| 20. Pay roll..... | ..... | \$4,000.00 | | \$1,450.30 | | \$372.70 | | \$240.00 | |
| 21. Subsistence..... | ..... | 816.96 | | 182.18 |  | ..... |  | 42.03 | |
| 22. Fuel..... | 80.02 | 1,339.02 | | 718.12 | | 250.60 | | 105.81 | |
| 23. Supplies (machinery)..... | ..... | 141.37 | | 103.42 | | 63.70 | | 9.88 | |
| 24. Repairs..... | ..... | 181.74 | | 5.85 | | 96.59 | | 8.97 | |
| (c) Hull..... | ..... | 172.56 | | 74.57 | | 33.32 | | 9.52 | |
| (b) Machinery..... | ..... | ..... |  | 7.68 |  | ..... |  | ..... |  |
| 25. Additions and alterations..... | ..... | ..... |  | ..... |  | ..... |  | ..... |  |
| 26. Miscellaneous..... | 6.23 | 350.12 | | 1.46 | | 25.13 |  | ..... |  |
| 27. Total..... | \$15.25 | ..... |  | ..... |  | ..... |  | ..... |  |
| 28. Approximate number of miles run during year..... | 15..... | \$7,004.77 | | 3,973..... | | \$551.09 | | 2,200..... | |
| 29. Number of days in commission..... | 18..... | 360..... | | 250..... |  | ..... |  | 325..... | |
| 30. Cost of fuel per gallon..... | 16.4 cents..... | 144, 151, 164, 171, 184, 194 cents. | | 164 cents..... |  | ..... |  | \$0.198..... | |
| | | <i>Remarks.</i> | | <i>Remarks.</i> | | <i>Remarks.</i> | | <i>Remarks.</i> | |
| | | Purchased during latter part of season of 1916, to patrol upper entrance to Keeweenaw Waterway, Mich. | | Use for inspection of fish traps and other public works on Puget Sound, Wash. | | Used for inspection of various streams of the district, light towing, surveys, etc. | | Tender to dredge Miller. Placed in commission in June. | |
| | | | | | | | | Employed on upper Columbia River tending drill b at No. 3, carrying supplies, running anchor lines, etc. | |

TABLE XVII.—*Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Purpose. | Piquippe. | Pathfinder. | Pearl. | Pedrito. |
|--|------------------------------|--|---|--------------------------------|-------------------------------|
| 1. District..... | Second, Portland, Oreg. | Norfolk, Va. | Baltimore, Md. | Second, Cincinnati, Ohio. | Los Angeles, Cal. |
| 2. Where built..... | Morris Heights, N. Y. | Muskegon, Mich. | Fort Howard, Md. | Grand Rapids, Mich. | Los Angeles Harbor, Cal. |
| 3. When built..... | 1899. | 1914. | 1909. | 1899. | 1904. |
| 4. Builder..... | Chas. L. Seabury..... | Racine-Truscott-Shell Lake Boat Co. | U. S. Engineer Department employees. | (George H. Gere) | H. E. Carse. |
| 5. Time to build..... | ..... | 11 months. | 4 months. | Unknown..... | 70 days. |
| 6. Where purchased..... | ..... | Muskegon, Mich. .... | ..... | Grand Rapids, Mich. | Los Angeles Harbor, Cal. |
| 7. When purchased..... | ..... | ..... | ..... | 1899. | 1904. |
| 8. From whom purchased..... | ..... | Racine-Truscott-Shell Lake Boat Co. .... | ..... | (George H. Gere) | H. E. Carse. |
| 9. Purchase price..... | Not known..... | \$27,581.67. .... | ..... | \$1,705. | \$1,732.50. |
| 10. Contract cost..... | ..... | \$27,581.67. .... | ..... | Unknown..... | \$1,732.50. |
| 11. Complete cost with outfit..... | ..... | \$27,581.67. | \$1,360. .... | ..... | \$1,732.50. |
| 12. Present value..... | \$1,000. | \$27,581.67. | \$750. .... | ..... | \$135. |
| 13. Hull: | ..... | ..... | ..... | ..... | ..... |
| (a) Material of hull..... | Wood. | Wood. | Wood. | Wood. | Wood. |
| (b) Length over all..... | 30 feet 3 inches. | 82 feet 9 inches. | 38 feet. | 40 feet. | 40 feet. |
| (c) Length on water line..... | 30 feet. | 77 feet. | 36 feet 6 inches. | 36 feet 10 inches. | 30 feet. |
| (d) Beam over all..... | 8 feet. | 15 feet 6 inches. | 9 feet 6 inches. | 7 feet 6 inches. | 7 feet. |
| (e) Beam on water line..... | 7 feet 8 inches. | 14 feet 11 inches. | 8 feet. | 7 feet 1½ inches. | 6 feet 2 inches. |
| (f) Depth of hull forward..... | 4 feet 6 inches. | 12 feet 6 inches. | 6 feet 5 inches. | 4 feet 4 inches. | 3 feet 10 inches. |
| (g) Depth of hull amidships..... | 4 feet. | 9 feet 6 inches. | 5 feet 2 inches. | 4 feet. | 3 feet 4 inches. |
| (h) Depth of hull aft..... | 4 feet. | 10 feet. | 6 feet 4 inches. | 4 feet 2 inches. | 3 feet 8 inches. |
| (i) Draft forward..... | 1 foot 6 inches. | 5 feet. | 2 feet 6 inches. | 1 foot 6 inches. | 2 feet 6 inches. |
| (j) Draft aft..... | 2 feet 6 inches. | 6 feet. | 3 feet. | 3 feet. | 2 feet 6 inches. |
| (k) Draft to bottom of propeller..... | 2 feet 6 inches. | 5 feet 7 inches. | 2 feet 7 inches. | 2 feet 6 inches. | 2 feet 6 inches. |
| (l) Depth of keel from bottom of outside of plating..... | 2½ inches. | 7 inches. | 3 inches. | 5 inches. | 4 inches. |
| (m) Displacement (long tons). | 6. | 65. | 10. | 5. | 2.2. |
| (n) Speed in statute miles per hour..... | 8. | 10½. | 8.5. | 9. | 9. |

| 14. House. | | | | | | | | | |
|-------------|------------|------------------------|---------------------|---------------------------|-------------------------------------|--|-------------------------------|-------------------------------|-------------------------------|
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | (e) Length. | (f) Width. | (g) Height above deck. | (h) Accommodations. | (i) Length. | (j) Width. |
| None. | None. | None. | None. | 51 feet. | 22 feet 3 inches. | 23 feet. | Canopy over engine, 104 feet. | Canopy over engine, 104 feet. | Canopy over engine, 104 feet. |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 11 feet. | 7 feet. | 3 feet 9 inches. | Canopy over engine, 7 feet. | Canopy over engine, 7 feet. | Canopy over engine, 7 feet. |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 7 feet 6 inches. | 43 inches forward; 30 inches aft. | 3 feet 9 inches. | Forward, 6 feet; aft, 7 feet. | Forward, 6 feet; aft, 7 feet. | Forward, 6 feet; aft, 7 feet. |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 8. | None. | None. | Open cockpit. | Open cockpit. | Open cockpit. |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 1. | 1. | 1. | 1. | 1. | 1. |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 4-cycle. | 3-cylinder, 4-cycle, gasoline. | 4-cycle. | 4-cycle. | 4-cycle. | 4-cycle. |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 1913. | 1909. | 1909-10. | 1904. | 1904. | 1904. |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | Union Gas Engine Co. | Monarch. | Clifton Motor Works, Cincinnati, Ohio. | Standard. | Standard. | Standard. |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 2. | 3. | 4. | 2. | 2. | 2. |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 64 inches. | 54 inches. | 64 inches. | 6 inches. | 6 inches. | 6 inches. |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 8 inches. | 7 inches. | 7 inches. | 74 inches. | 74 inches. | 74 inches. |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 400. | 600. | 400. | 400. | 400. | 400. |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 16. | 21 at 750 revolutions. | 28. | 16. | 16. | 16. |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 1,750 pounds. | 1,800 pounds. | 2,400 pounds. | 1,785 pounds. | 1,785 pounds. | 1,785 pounds. |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 4. | 3. | 3. | 3. | 3. | 3. |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 26 inches. | 24 inches. | 28 inches. | 2 feet. | 2 feet. | 2 feet. |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 30 inches. | 36 inches. | 42 inches. | Not known. | Not known. | Not known. |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 14 inches. | 14 inches. | 14 inches. | 14 inches. | 14 inches. | 14 inches. |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | None. | None. | None. | None. | None. | None. |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | Hot water. | 3 feet 3 inches by 1 foot 4 inches. | None. | None. | None. | None. |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 14. | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | General Electric Co. | General Electric Co. | None. | None. | None. | None. |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 2-cycle, gasoline engine. | 2-cycle, gasoline engine. | None. | None. | None. | None. |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 1,000. | 1,000. | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 35. | 24 inches. | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 12. | 36 inches. | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 10 inches. | 14 inches. | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 6. | 2 men to operate. | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | 1. | 2 men to operate. | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (a) Length. | (b) Width. | (c) Height above deck. | (d) Accommodations. | | | | | | |
| (| | | | | | | | | |

TABLE XVII.—Report of operations of gasoline launches (acrued) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Papoose. | Paquippa. | Pebbinder. | Pearl. | Pedrito. |
|--|--|--|---|--|----------------------------------|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | \$835.00 | \$3,975.00 | (1) | \$1,353.33 | (1) |
| 21. Subsistence..... | 127.02 | 1,317.50 | (1) | 616.42 | ..... |
| 22. Fuel..... | 211.65 | 1,076.78 | \$92.00 | 20.50 | ..... |
| 23. Supplies (machinery)..... | 8.10 | 342.49 | ..... | 77.45 | ..... |
| 24. Repairs..... | 15.05 | 364.81 | 1.05 | 17.10 | ..... |
| (6) Fuel..... | 70.45 | 728.41 | ..... | ..... | ..... |
| (6) Machinery..... | ..... | ..... | ..... | ..... | ..... |
| 25. Additions and alterations..... | ..... | ..... | 7.38 | 5.00 | ..... |
| 26. Miscellaneous..... | 9.52 | 502.43 | ..... | ..... | ..... |
| 27. Total..... | \$1,076.80 | \$8,500.53 | \$98.43 | 2,865. | \$2,080.80 |
| 28. Approximate number of miles run during year..... | No record. | 6,527. | 727. | ..... | ..... |
| 29. Number of days in commission..... | 259. | 365. | 271. | 338. | ..... |
| 30. Cost of fuel per gallon..... | 18.31 cents. | \$0.20176. | 24 cents. | \$0.215. | ..... |
| | Remarks. | Remarks. | Remarks. | Remarks. | Remarks. |
| | Operated at mouth of Columbia River, Oreg. and Wash., as tender for dredge Chinook, and in survey and dispatch work on Columbia River below mouth of Willamette River. | Operated on all works in Norfolk, Va., district. | Transporting working parties at frequent intervals between the different forts in the district.
1. No regular crew employed. When running, was operated by engineer employees. | Was operated on Kentucky River, making inspection trips, delivering supplies, doing miscellaneous light towing, assisting as tender to dredge and stream-gauging operations. | 1 Out of commission entire year. |

| Name..... | Report. | Placer. | Pile. | Poly. | Penates. |
|--|---|----------------------------|---------------------------------|----------------------------|---|
| 1. District..... | New London, Conn. | Se-wod, (In-nall, Ohio. | Boston, Mass. | Wilmington, N. C. | Norfolk, Va. |
| 2. Where built..... | do. | May 17, Mich. | do. | Dorby, Conn. | St. Joseph, Mich. |
| 3. When built..... | 1912. | 1908. | 1899. | 1898. | 1910. |
| 4. Builder..... | Louis Anderson. | Pioneer Boat & Pattern Co. | The O. Sheldon Co. | Houstonic Skill & (amoo o. | Trus-vott Boat Manufactur- |
| 5. Time to build..... | Unknown. | 2 months. | 9 months. | Unknown. | ing o. |
| 6. Where purchased..... | New London, Conn. | May 17, Mich. | do. | Dorby, Conn. | 60 days. |
| 7. When purchased..... | No. 28, 1912. | 1908. | do. | 1898. | St. Joseph, Mich. |
| 8. From whom purchased..... | Louis Anderson. | Pioneer Boat & Pattern Co. | do. | Trus-vott Boat Manufactur- | ing o. |
| 9. Purchase price..... | \$1,300. | \$1,975. | \$3,980. | \$350. | \$2,880. |
| 10. Entire cost..... | \$1,300. | \$1,975. | \$3,980, outfit came with boat. | Cost included outfit. | \$2,880. |
| 11. Complete cost with outfit..... | \$1,300. | \$1,975. | \$3,980. | \$75. | \$1,500.] |
| 12. Present value..... | | \$630. | \$750. | Wood. | Frame and peel of white oak; |
| 13. Hull: | Cedar plank and oak frame. | Wood. | Wood. | Wood. | plan-ing of white cedar. |
| (a) Material of hull..... | | | | | 40 feet 2 in.-hes. |
| (b) Length over all..... | 28 feet 3 in.-hes. | 35 feet. | 56 feet. | 16 feet. | 30 feet 5 in.-hes. |
| (c) Length on water line..... | 28 feet 3 in.-hes. | 34 feet 5 in.-hes. | 49 feet. | 15 feet. | 10 feet 2 in.-hes. |
| (d) Beam over all..... | 7 feet 4 in.-hes. | 8 feet 6 in.-hes. | 9 feet. | 4 feet 10 in.-hes. | 8 feet 10 in.-hes. |
| (e) Beam on water line..... | 5 feet 6 in.-hes. | 8 feet 6 in.-hes. | 8 feet 8 in.-hes. | 3 feet 10 in.-hes. | 5 feet 2 in.-hes. |
| (f) Depth of hull forward..... | 4 feet 6 in.-hes. | 4 feet 10 in.-hes. | 4 feet 6 in.-hes. | 3 feet 6 in.-hes. | 4 feet 3 in.-hes. |
| (g) Depth of hull amidships..... | 3 feet 8 in.-hes. | 3 feet 7 in.-hes. | 5 feet. | 2 feet 8 in.-hes. | 4 feet 10 in.-hes. |
| (h) Depth of hull aft..... | 3 feet. | 4 feet 3 in.-hes. | 6 feet 6 in.-hes. | 1 foot 2 in.-hes. | 2 feet 6 in.-hes. |
| (i) Draught forward..... | 1 foot 9 in.-hes. | 1 foot 3 in.-hes. | 1 foot 9 in.-hes. | 1 foot 8 in.-hes. | 3 feet. |
| (j) Draught aft..... | 2 feet 7 in.-hes. | 1 foot 8 in.-hes. | 4 feet 9 in.-hes. | 2 feet 6 in.-hes. | 2 feet 7 in.-hes. |
| (k) Draught to bottom of propeller..... | 2 feet 4 in.-hes. | 1 foot 4 in.-hes. | 4 feet. | 2 feet 3 in.-hes. | 3 in.-hes. |
| (l) Depth of keel from bottom of outside of planing..... | Forward, 4 in.-hes; aft, 1 foot 10 in.-hes. | 2 in.-hes. | 6 in.-hes. | 3 in.-hes. | |
| (m) Displacement (long tone). | 2½. | 6. | 19. | 2. | 6.4. |
| (n) Speed in statute miles per hour. | 8 to 9. | 8.25. | 9. | 0. | 10. |
| 14. House: | No house. | 19 feet. | 22 feet. | None. | 20 feet 8 in.-hes. |
| (a) Length..... | | 7 feet 6 in.-hes. | 9 feet 9 in.-hes. | | 6 feet 10 in.-hes. |
| (b) Width..... | | 4 feet. | 3 feet. | | Pilot house, 4 feet; cabin, 3 feet 2 in.-hes. |
| (c) Height above deck..... | | | | | |
| (d) Accommodations..... | | None. | Temporary for 12. | | 4. |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Piquet. | Pioneer. | Pitche. | Polty. | Peehain. |
|---|-----------------------|--------------------------|-------------------------|----------------------|-------------------|
| 15. Motors: | | | | | |
| (a) Number..... | 1..... | 1..... | 1..... | 1..... | 1..... |
| (b) Type..... | 2-cycle..... | 4-cycle, gasoline..... | 4-cycle..... | 2-cycle..... | 4-cycle..... |
| (c) When built..... | 1912..... | 1913..... | 1904..... | Unknown..... | Unknown..... |
| (d) Make..... | J. W. Lathrop Co..... | Clifton Motor Works..... | Murray & Tregurtha..... | Stanley Co..... | Trusdell..... |
| (e) Number of cylinders (1 engine)..... | 2..... | 4..... | 4..... | 1..... | 4..... |
| (f) Diameter of cylinder..... | 5½ inches..... | 6½ inches..... | 6½ inches..... | 4½ inches..... | 5½ inches..... |
| (g) Stroke..... | 6½ inches..... | 7 inches..... | 6 inches..... | 5 inches..... | 6 inches..... |
| (h) Revolutions per minute..... | 450..... | 400..... | 300..... | 500..... | 630..... |
| (i) Rated brake horse power..... | 12..... | 28..... | 25..... | 5..... | Unknown..... |
| (j) Weight of 1 motor (total)..... | 900 pounds..... | 1,800 pounds..... | 3,500 pounds..... | 281 pounds..... | 1,350 pounds..... |
| 16. Propeller: | | | | | |
| (a) Number of blades..... | 3..... | 3..... | 3..... | 3..... | 3..... |
| (b) Diameter..... | 24 inches..... | 24 inches..... | 36 inches..... | 17 inches..... | 26 inches..... |
| (c) Pitch..... | 26 inches..... | 40 inches..... | 40 inches..... | 25.2 inches..... | Unknown..... |
| (d) Diameter of shaft..... | 1½ inches..... | 1½ inches..... | 2 inches..... | ½ inch..... | 1½ inches..... |
| 17. Heating system: | | | | | |
| (a) Type..... | None..... | None..... | None..... | None..... | None..... |
| (b) Size of heater..... | None..... | None..... | None..... | None..... | None..... |
| (c) Number of radiators..... | None..... | None..... | None..... | None..... | None..... |
| 18. Electric-light plant: | | | | | |
| (a) Make..... | None..... | None..... | None..... | None..... | None..... |
| (b) Type of motor..... | None..... | None..... | None..... | None..... | None..... |
| (c) Brake horsepower..... | None..... | None..... | None..... | None..... | None..... |
| (d) Revolutions per minute..... | None..... | None..... | None..... | None..... | None..... |
| (e) Capacity of generator in kilowatts..... | None..... | None..... | None..... | None..... | None..... |
| (f) Number of lights..... | None..... | None..... | None..... | None..... | None..... |
| (g) Average candle-power per light..... | None..... | None..... | None..... | None..... | None..... |
| (h) Diameter of searchlight..... | None..... | None..... | None..... | None..... | None..... |
| 19. Number of men in crew..... | None..... | 1..... | 2..... | No regular crew..... | None..... |

OPERATING COST.

| | | | | |
|--|---|---|--|----------------------------|
| 20. Pay roll..... | \$490.00 | \$2,160.00 | | |
| 21. Substances..... | | | | |
| 22. Fuel..... | \$79.93 | 930.32 | \$37.60 | |
| 23. Supplies (machinery)..... | 2.62 | 16.56 | 9.32 | |
| 24. Repairs:..... | | | | |
| (a) Hull..... | 128.62 | 98.28 | 12.18 | |
| (b) Machinery..... | 24.72 | 23.80 | | |
| 25. Additions and alterations..... | | | | |
| 26. Miscellaneous..... | 31.07 | | 1.00 | |
| 27. Total..... | \$266.96 | | | |
| 28. Approximate number of miles run during year..... | 1,500 | \$3,229.27 | 993. | \$80.00 |
| 29. Number of days in commission..... | 255 | 385 | 244 | |
| 30. Cost of fuel per gallon..... | 22, 23, 25, and 27 cents. | 18 to 25 cents. | 23 cents. | |
| | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> |
| | Surveys examinations and inspection of the various rivers and harbors in the district and making trips to the island forts. | Operated in Boston Harbor and tributaries as general survey boat. | Tending survey party and dredges Ajax on Cape Fear above Wilmington, N. C. | Not in commission in 1916. |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Primary. | Pulaski. | Quincy. | East. | Rece. |
|---|-------------------------------------|-------------------------|-----------------------------|------------------------|------------------------------------|
| 1. District..... | Montgomery, Ala..... | Savannah, Ga..... | Rock Island, Ill..... | Kansas City, Mo..... | Washington, D. C. |
| 2. Where built..... | Greensport, L. I..... | Jacksonville, Fla..... | St. Paul, Minn..... | St. Louis, Mo..... | Rebuilt in Washington, D. C. |
| 3. When built..... | 1905..... | 1914..... | 1912..... | 1910..... | November and December, 1916. |
| 4. Builder..... | Jas. Reilly Repair & Supply Co..... | Merrill-Stevens Co..... | Jas. Dingle Boat Works..... | United States..... | Hired labor. |
| 5. Time to build..... | No record..... | 2 months..... | 9 months..... | 1 month..... | 6 weeks. |
| 6. Where purchased..... | Greensport, L. I..... | Jacksonville, Fla..... | St. Paul, Minn..... | ..... | Hull purchased Westland, Va. |
| 7. When purchased..... | 1905..... | 1914..... | 1912..... | ..... | Hull 1916. |
| 8. From whom purchased..... | Jas. Reilly Repair & Supply Co..... | Merrill-Stevens Co..... | Jas. Dingle Boat Works..... | ..... | Hull purchased from L. W. Shelton. |
| 9. Purchase price..... | Not known..... | \$550..... | \$1,500..... | ..... | Hull, \$300. |
| 10. Contract cost..... | do..... | \$550..... | \$1,500..... | \$250..... | Cost of rebuilding, \$500. |
| 11. Complete cost with outfit..... | do..... | \$665..... | ..... | \$10..... | ..... |
| 12. Present value..... | \$250..... | \$450..... | \$835.50..... | \$180..... | ..... |
| 13. Hull: | | | | | |
| (a) Material of hull..... | Wood..... | Wood..... | Cypress..... | Wood..... | Georgia pine. |
| (b) Length overall..... | 18 feet 5 inches..... | 22 feet..... | 33 feet..... | 22 feet 6 inches..... | 40 feet 4 inches. |
| (c) Length on water line..... | 17 feet..... | 22 feet..... | 35 feet..... | 20 feet 11 inches..... | 34 feet 10 inches. |
| (d) Beam over all..... | 5 feet..... | 7 feet..... | 6 feet 3 inches..... | 4 feet 7 inches..... | 10 feet 4 inches. |
| (e) Beam on water line..... | 3 feet 4 inches..... | 6 feet..... | 6 feet 3 inches..... | 3 feet 9 inches..... | 8 feet. |
| (f) Depth of hull forward..... | 2 feet 3 inches..... | 3 feet 8 inches..... | 3 feet 9 inches..... | 1 foot 8 inches..... | 4 feet 10 inches. |
| (g) Depth of hull amidships..... | 2 feet..... | 2 feet 9 inches..... | 3 feet 6 inches..... | 1 foot 7 inches..... | 4 feet 2 inches. |
| (h) Depth of hull aft..... | 2 feet 1 inch..... | 3 feet 6 inches..... | 2 feet 6 inches..... | 1 foot 8 inches..... | 6 feet 1 inch. |
| (i) Draft forward..... | 6 inches..... | 9 inches..... | 11 inches..... | 7 inches..... | 11 inches. |
| (j) Draft at..... | 1 foot 9 inches..... | 1 foot 10 inches..... | 3 inches..... | 1 foot 8 inches..... | 3 feet 4 inches. |
| (k) Draft at bottom of propeller..... | 1 foot 8 inches..... | 1 foot 6 inches..... | 2 feet 8 inches..... | 1 foot 6 inches..... | 2 feet 8 inches. |
| (l) Depth of keel from bottom of cradle of plating..... | 2 inches..... | 3 inches..... | ..... | No keel..... | 4 inches. |
| (m) Displacement (long tons)..... | 11..... | 2.08..... | 4..... | 1..... | 0.5. |
| (n) Speed in statute miles per hour..... | 61..... | 6 to 7..... | 14.5, average..... | 41..... | About 31. |

FLOATING PLANT.

4615

| | | | | | |
|---|--------------------------|----------------------------|--|---------------------------------|---|
| 14. House: | | None..... | 12 feet, automobile top.....
5 feet 3 inches.....
5 feet 4 inches..... | None..... | 9 feet 2 inches.....
7 feet 4 inches.....
4 feet..... |
| (a) Length..... | | | | | |
| (b) Width..... | | | | | |
| (c) Height above deck..... | | | | | |
| 15. Motors: | | | 14..... | | None..... |
| (a) Accommodations..... | | | | | |
| (b) Number..... | 1..... | Model A, with magneto..... | 1..... | Model B, 1910, Gray marine..... | 1..... |
| (c) Type..... | | | 4-cycle..... | | 4-cycle..... |
| (d) When built..... | 1911..... | Unknown..... | 1912..... | 1910..... | 1914..... |
| (e) Make..... | New London Motor Co..... | Manassus Motor Works..... | Capitol..... | Gray..... | Buffalo Gasoline Motor Co..... |
| (f) Number of cylinders (one engine)..... | 1..... | 1..... | 4..... | 1..... | 2..... |
| (g) Diameter of cylinder..... | 4 1/2 inches..... | 5 1/2 inches..... | 5 1/2 inches..... | 4 1/2 inches..... | 6 inches..... |
| (h) Stroke..... | 5 inches..... | 6 inches..... | 6 inches..... | 4 inches..... | 7 1/2 inches..... |
| (i) Revolutions per minute..... | 350..... | 400..... | 350..... | 485..... | 350..... |
| (j) Rated brake horsepower (total)..... | 5 1/2..... | 7 1/2..... | 35..... | 6..... | 13 to 15..... |
| (k) Weight of one motor..... | 280 pounds..... | Unknown..... | 675 pounds..... | 225 pounds..... | 1,400 pounds..... |
| 16. Propeller: | | | | | |
| (a) Number of blades..... | 3..... | 3..... | 3..... | 3..... | 3..... |
| (b) Diameter..... | 18 inches..... | 21 inches..... | 15 inches..... | 16 inches..... | 24 inches..... |
| (c) Pitch..... | 24 inches..... | 21 inches..... | 22 inches..... | 22 inches..... | 26 inches..... |
| (d) Diameter of shaft..... | 1 inch..... | 1 inch..... | 1 1/2 inches..... | 1 inch..... | 1 1/2 inches..... |
| 17. Heating system: | | | | | |
| (a) Type..... | None..... | None..... | None..... | None..... | None..... |
| (b) Size of heater..... | | | | | |
| (c) Number of radiators..... | | | | | |
| 18. Electric light plant: | | | | | |
| (a) Make..... | None..... | None..... | None..... | None..... | None..... |
| (b) Type of motor..... | | | | | |
| (c) Brake horsepower..... | | | | | |
| (d) Revolutions per minute..... | | | | | |
| (e) Capacity of generator in kilowatts..... | | | | | |
| (f) Number of lights..... | | | | | |
| (g) Average candle power per light..... | | | | | |
| (h) Diameter of screw light..... | | | | | |
| 19. Number of men in crew: | | | | | |
| (a) Regular crew..... | None..... | None..... | 1..... | 1..... | 1..... |

TABLE XVII.—Report of operations of gasoline launches (crew) for the calendar year ending Dec. 31, 1916—Continued.

| Name | Primary. | Pulaski. | Quincy. | Recht. | Relat. |
|--|--|--|---|---|---|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | | | \$290.00 | \$290.03 | \$668.95 |
| 21. Subsistence..... | | | 74.00 | 137.28 | 265.80 |
| 22. Fuel..... | \$19.20 | | 247.76 | 179.60 | 35.29 |
| 23. Supplies (machinery)..... | | | 25.30 | 37.22 | |
| 24. Repairs: | | | | | |
| (a) Hull..... | | | 13.45 | | 500.00 |
| (b) Machinery..... | | | 59.36 | 57.76 | 141.96 |
| 25. Additions and alterations..... | | | | | |
| 26. Miscellaneous..... | | | 10.22 | | |
| 27. Total..... | \$19.20 | | \$720.09 | \$710.81 | \$1,534.95 |
| 28. Approximate number of miles run during year..... | 104. | | 4,184. | 4,143. | 3,300. |
| 29. Number of days in commission..... | 45 (in actual use) | | 124. | 283. | 306. |
| 30. Cost of fuel per gallon..... | \$0.225. | | \$0.1697. | \$0.175. | 20 to 25 cents. |
| | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> |
| | This plant was used as a tender to the U. S. dredge Caneau, in Pensacola Harbor, Fla., having no regular duty and making only special trips, when necessary, being operated by one of the Caneau crew detailed for the purpose; was in commission and ready for duty during the entire period. | Used as tender to U. S. dredge Cumberland. Cost of operation included in cost of operation of dredge Cumberland. | Used as inspection boat on upper Mississippi River, division, Hannibal to Missouri River. | Operated on the Osage River, Mo., dispatch service. | A new hull was purchased. The building of engine and installation of engine was done by hired labor. Launch was used for towing, inspection, and surveys in Potomac and Anacostia Rivers. |

| Name..... | Rally. | Rio Vista. | Robert, J. | Rock. | Roland. |
|--|--------------------|--------------------------------------|-------------------|-------------------|------------------------------|
| 1. District..... | Mobile, Ala. | Third, San Francisco, Cal. | Wilmington, N. C. | Wilmington, N. C. | Vicksburg, Miss. |
| 2. Where built..... | Pascagoula, Miss. | Sacramento, Cal. | Newbern, N. C. | Southport, N. C. | Grafton, Ill. |
| 3. When built..... | 1914 | 1913 | 1911 | 1908 | 1914 |
| 4. Builder..... | United States. | Nunes Bros. and Atlas Gas Engine Co. | United States. | George H. Greer. | Ripley Steel Boat & Mfg. Co. |
| 5. Time to build..... | 144 days. | 5 months. | 2 months. | 2 months. | 3 months. |
| 6. Where purchased..... | | | | Wilmington, N. C. | Grafton, Ill. |
| 7. When purchased..... | | | | 1913 | 1914 |
| 8. From whom purchased..... | | | | George H. Greer. | Ripley Steel Boat & Mfg. Co. |
| 9. Purchase price..... | | | | \$300. | \$135.50. |
| 10. Contract cost..... | | \$8,200. | | \$300. | \$135.50. |
| 11. Complete cost with outfit..... | \$4,685.53. | \$9,961.60. | \$160. | \$300. | \$135.50. |
| 12. Present value..... | \$4,000. | \$8,000. | \$25. | \$200. | \$90. |
| 13. Hull: | | | | | |
| (a) Material of hull..... | Wood. | Wood. | Wood. | Wood. | Steel. |
| (b) Length over all..... | 40 feet 9 inches. | 60 feet. | 24 feet. | 26 feet. | 24 feet 4 inches. |
| (c) Length on water line..... | 36 feet 8 inches. | 53 feet 1 1/2 inches. | 22 feet. | 22 feet 6 inches. | 23 feet 1 inch. |
| (d) Beam over all..... | 12 feet 3 inches. | 16 feet. | 4 feet 6 inches. | 7 feet 3 inches. | 4 feet 10 inches. |
| (e) Beam on water line..... | 11 feet 6 inches. | 14 feet. | 4 feet 2 inches. | 7 feet. | 4 feet. |
| (f) Depth of hull forward..... | 6 feet 6 inches. | 8 feet. | 2 feet 6 inches. | 4 feet. | 3 feet 4 inches. |
| (g) Depth of hull amidships..... | 5 feet. | 7 feet. | 1 foot 8 inches. | 3 feet 10 inches. | 2 feet 9 inches. |
| (h) Depth of hull aft..... | 6 feet 1 inch. | 6 feet 10 inches. | 2 feet. | 3 feet 3 inches. | 2 feet. |
| (i) Draft forward..... | 2 feet 10 inches. | 4 feet. | 6 inches. | 1 foot 6 inches. | 6 inches. |
| (j) Draft aft..... | 4 feet. | 5 feet 4 inches. | 1 foot 10 inches. | 2 feet 8 inches. | 6 inches. |
| (k) Draft to bottom of propeller..... | 3 feet 10 inches. | 5 feet. | 1 foot 6 inches. | 2 feet 4 inches. | 2 feet. |
| (l) Depth of keel from bottom of outside planking..... | 4 inches. | 7 inches. | 4 inches. | 3 inches. | 1 inch. |
| (m) Displacement (long tons). | 25. | 45.5. | 1. | 5. | 2. |
| (n) Speed in statute miles per hour. | 8 to 9. | 10.08. | 8. | 8. | 9. |
| 14. House: | | | | | |
| (a) Length..... | 19 feet 11 inches. | 22 feet 3 inches. | None. | None. | |
| (b) Width..... | 7 feet 8 inches. | 10 feet. | | | |
| (c) Height above deck..... | 3 feet 8 inches. | 3 feet; wheelhouse, 7 feet. | | | |
| (d) Accommodations..... | 4 men. | Berths for 2 men. | | | |

TABLE XVII.—*Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Reliq. | Elo Vista. | Robert, J. | Rocka. | Reiland. |
|---|----------------------|--|------------------|------------|-----------------|
| 15. Motors: | | | | | |
| (a) Number..... | 1..... | 1..... | 1..... | 1..... | 1..... |
| (b) Type..... | 4-cycle | 4-cycle | 4-cycle | 4-cycle | 4-cycle |
| (c) When built..... | 1911 | 1913 | 1914 | 1914 | 1914 |
| (d) Make..... | Wolverine | Atlas O. Engine Co., Oakland, Cal. | Racine | Knox | Gray Motor Co. |
| (e) Number of cylinders (1 engine)..... | 3..... | 4..... | 2..... | 2..... | 2..... |
| (f) Diameter of cylinder..... | 8½ inches | 10½ inches | 4 inches | 8 inches | 4 inches |
| (g) Stroke..... | 9 inches | 12 inches | 4½ inches | 6 inches | Do. |
| (h) Revolutions per minute..... | 350 | 300 | 600 | 450 | 700 |
| (i) Rated brake horsepower..... | 43.75 | 110 | 10 | 9 | 9 |
| (j) Weight of 1 motor..... | 4,200 pounds | 12,000 pounds | 600 pounds | 390 pounds | 229 pounds |
| 16. Propeller: | | | | | |
| (a) Number of blades..... | 4..... | 3..... | 2..... | 3..... | 3..... |
| (b) Diameter..... | 33 inches | 50 inches | 18 inches | 21 inches | 1 foot 6 inches |
| (c) Pitch..... | 12 inches | 48 inches | Variable (Roper) | 22 inches | Do. |
| (d) Diameter of shaft..... | 2½ inches | 3½ inches | 1 inch | 1½ inches | 1½ inches |
| 17. Hoisting system: | | | | | |
| (a) Type..... | None | None | None | None | None |
| (b) Size of hoister..... | | | | | |
| (c) Number of radiators..... | | | | | |
| 18. Electric-light plant: | | | | | |
| (a) Make..... | Dayton | Dayton Electrical Mfg. Co., Dayton, Ohio, 15-light outfit. | None | None | None |
| (b) Type of motor..... | K..... | Belt from main engine; no motor | | | |
| (c) Brake horsepower..... | 1..... | About 1.4 horsepower required to drive generator. | | | |
| (d) Revolutions per minute..... | 1,300 | 1,300 | | | |
| (e) Capacity of generator in kilowatts..... | Less than 1 kilowatt | 1..... | | | |
| (f) Number of lights..... | 4..... | 15 | | | |

| (c) Average candle-power per light. | | | | (d) Diameter of searchlight. | | | |
|--|---|---|-------------------------------------|--|---|-------------|---------|
| 19. Number of men in crew | | | | 1. | | | |
| OPERATING COST. | | | | 1. | | | |
| 20. Pay roll..... | \$1,433.82 | 10 inches..... | \$2,427.89 | 1 man: transferring men; no regular crew. | \$180.00 | (1) | |
| 21. Subsistence..... | 361.00 | 3..... | 461.50 | | 106.70 | \$45.86 | |
| 22. Fuel..... | 777.93 | | 2,247.24 | | 65.25 | 80.75 | |
| 23. Supplies (machinery)..... | 24.31 | | 288.25 | | | | |
| 24. Repairs: | | | | | | | |
| (a) Hull..... | 31.34 | | 176.05 | | 8.08 | | |
| (b) Machinery..... | 26.00 | | 108.11 | | 30.20 | 20.13 | |
| 25. Additions and alterations..... | | | 137.39 | | | | |
| 26. Miscellaneous..... | 40.54 | | | | 5.00 | 2.00 | |
| Total..... | \$2,714.94 | | \$5,905.93 | | | | \$98.74 |
| 27. Approximate number of miles run during year..... | 800 | 12,000..... | | 2,050..... | \$395.53 | 700. | |
| 28. Number of days in commission..... | 298 | 308..... | | 150..... | | 20. | |
| 29. Cost of fuel per gallon..... | 13 to 20 cents. | 7.555 cents..... | | 22 cents..... | | 24.4 cents. | |
| | Remarks. | Remarks. | Remarks. | Remarks. | | Remarks. | |
| | This boat was operated during the first four months as an attendant launch to dredge Wahalak in Mobile Harbor when plant was laid up, and during the last four months in connection with dredge (fullport, at Gulfport, Miss. | Sacramento River, Cal., between Colusa and Rio Vista as dredge tender for hydraulic pipe line dredges Sacramento and San Joaquin. | Out of commission. Rebuilt in 1911. | This launch has been used in connection with surveys on the Cape Fear River and for transferring men and material to U. S. yard, Wilmington, N. C. | Carrying miscellaneous supplies, Grand Mary Landing to Lock and Dam No. 6. Operated by lockmen. | | |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Names..... | Salmon. | Salvador. | Santa Rosa. | Scotsguade. | Schuyler. |
|---|----------------------------|--------------------------|----------------------------|------------------------------|-------------------|
| 1. District..... | Second, Portland, Ore..... | New Orleans, La..... | Montgomery, Ala..... | Buffalo, N. Y..... | Second, New York. |
| 2. Where built..... | Portland, Ore..... | Muskegon, Mich..... | Pensacola navy yard..... | Muskegon, Mich..... | Plattsburg, N. Y. |
| 3. When built..... | 1910..... | 1906..... | 1908..... | 1914..... | May, 1902. |
| 4. Builder..... | O. P. Graham..... | Racine Boat Mfg. Co..... | U. S. Navy Department..... | Racine-Truscott Boat Co..... | Lozier Motor Co. |
| 5. Time to build..... | 60 days..... | Unknown..... | 11 months..... | 12 months..... | New York City. |
| 6. Where purchased..... | ..... | Morgan City, La..... | Pensacola navy yard..... | Muskegon, Mich..... | May, 1902. |
| 7. When purchased..... | ..... | 1916..... | 1908..... | 1914..... | Morse & Elsemann. |
| 8. From whom purchased..... | ..... | J. R. Drackett..... | U. S. Navy Department..... | Racine-Truscott Boat Co..... | \$1,110.90. |
| 9. Purchase price..... | \$2,200..... | \$1,700..... | \$21,423.98..... | \$28,200..... | |
| 10. Contract cost..... | \$4,100..... | \$4,100..... | \$21,423.98..... | \$28,200..... | |
| 11. Complete cost with outfit..... | \$2,200..... | \$1,700..... | \$21,423.98..... | \$30,000..... | |
| 12. Present value..... | \$800..... | \$1,400..... | \$25,000..... | \$28,000..... | \$500. |
| 13. Hull: | | | | | |
| (a) Material of hull..... | Wood..... | Steel..... | Wood..... | Wood..... | Cedar. |
| (b) Length over all..... | 35 feet..... | 41 feet..... | 70 feet..... | 82 feet 9 inches..... | 25 feet. |
| (c) Length on water line..... | 34 feet 6 inches..... | 28 feet..... | 54 feet..... | 76 feet 8 inches..... | 24 feet 6 inches. |
| (d) Beam over all..... | 9 feet..... | 9 feet 6 inches..... | 16 feet..... | 15 feet 6 inches..... | 6 feet 3 inches. |
| (e) Beam on water line..... | 8 feet 4 inches..... | 9 feet 6 inches..... | 15 feet..... | 14 feet 4 inches..... | 6 feet. |
| (f) Depth of hull forward..... | 4 feet..... | 5 feet..... | 7 feet..... | 9 feet 6 inches..... | |
| (g) Depth of hull amidships..... | 3 feet 6 inches..... | 4 feet..... | 8 feet..... | 9 feet 6 inches..... | |
| (h) Depth of hull aft..... | 3 feet 3 inches..... | 3 feet..... | 5 feet..... | 9 feet 6 inches..... | 1 foot 4 inches. |
| (i) Draft forward..... | 1 foot 6 inches..... | 1 foot..... | 3 feet..... | 4 feet 6 inches..... | 2 feet 2 inches. |
| (j) Draft at..... | 2 feet 6 inches..... | 2 feet 2 inches..... | 4 feet 2 inches..... | 5 feet 8 inches..... | 2 feet 4 inches. |
| (k) Draft to bottom of propeller..... | 2 feet 3 inches..... | 2 feet..... | 3 feet 4 inches..... | 5 feet 1 inch..... | |
| (l) Depth of keel from bottom of outside of blanking..... | 12 inches..... | No keel..... | 4 inches..... | 8 inches..... | 3 inches. |
| (m) Displacement (long tons)..... | 64..... | 8..... | 64..... | 65..... | 1. |
| (n) Speed in statute miles per hour..... | 8..... | 8..... | 10..... | 11..... | 8. |
| 14. Horses: | | | | | |
| (a) Horses..... | 16 feet 7 inches..... | 20 feet 9 inches..... | 38 feet..... | 48 feet..... | 14 feet. |
| (b) Horses..... | 6 feet..... | 8 feet 6 inches..... | 14 feet..... | 11 feet 1 inch..... | 5 feet. |
| (c) Horses..... | 4 feet 4 inches..... | 4 feet 6 inches..... | 8 feet..... | 7 feet 3 inches..... | 4 feet. |
| (d) Accommodations..... | 2..... | 8..... | 12..... | Crew of 8 and 9 extra..... | None. |

| | | | | | | | |
|----------------------------|--|-------------------|----------------------------|-------------------------------------|---|-----------------|-------|
| 15. Motors: | (a) Number..... | 1..... | 1..... | 1..... | 1..... | 1..... | |
| | (b) Type..... | 4-cycle..... | 3-cylinder gasoline..... | Heavy duty..... | Vertical..... | 2-cycle..... | |
| | (c) When built..... | 1910..... | 1907..... | 1914..... | 1913..... | 1909..... | |
| | (d) Make..... | Lamb..... | Lamb Pout & Engine Co..... | Standard Motor Construction Co..... | Corliss..... | Bridgeport..... | |
| | (e) Number of cylinders (one engine)..... | 4..... | 3..... | 4..... | 6..... | 2..... | |
| | (f) Diameter of cylinder..... | 5½ inches..... | 6½ inches..... | 8 inches..... | 9½ inches..... | 3½ inches..... | |
| | (g) Stroke..... | 6 inches..... | 7 inches..... | 10 inches..... | 10½ inches..... | 4 inches..... | |
| | (h) Revolutions per minute..... | 300..... | 400..... | 350 to 400..... | 325..... | 300..... | |
| | (i) Rated brake horsepower (total)..... | 24..... | 30..... | 65-70..... | 125..... | 7..... | |
| | (j) Weight of one motor..... | 1,200 pounds..... | 1,250 pounds..... | 5,300 pounds..... | 10,000 pounds..... | 350 pounds..... | |
| 16. Propeller: | (a) Number of blades..... | 3..... | 3..... | 3..... | 3..... | 3..... | |
| | (b) Diameter..... | 22½ inches..... | 27 inches..... | 36 inches..... | 50 inches..... | 20 inches..... | |
| | (c) Pitch..... | 32 inches..... | 34 inches..... | 48 inches..... | 46 inches..... | None..... | |
| | (d) Diameter of shaft..... | 1½ inches..... | 1½ inches..... | 2½ inches..... | 3½ inches..... | None..... | |
| 17. Heating system: | (a) Type..... | None..... | do..... | Oil stoves..... | Hot-water..... | None..... | |
| | (b) Size of heater..... | ..... | do..... | ..... | Inside dimensions—diameter, 12 inches; height, 30 inches..... | ..... |  |
| | (c) Number of radiators..... | ..... | do..... | ..... | 14..... | ..... |  |
| 18. Electric-light plant: | (a) Make..... | None..... | do..... | General Electric Co..... | General Electric Co..... | None..... | |
| | (b) Type of motor..... | ..... | do..... | Thompson..... | General Electric..... | ..... |  |
| | (c) Brake horsepower..... | ..... | do..... | ..... | ..... | ..... |  |
| | (d) Revolutions per minute..... | ..... | do..... | 1,200..... | 1,200..... | ..... |  |
| | (e) Capacity of generator in kilowatts..... | ..... | do..... | ..... | 0.45..... | ..... |  |
| | (f) Number of lights..... | ..... | do..... | 13..... | 39..... | ..... |  |
| | (g) Average candle-power per light..... | ..... | do..... | 32..... | 10..... | ..... |  |
| | (h) Diameter of searchlight..... | ..... | do..... | 10 inches..... | 11 inches..... | ..... |  |
| 19. Number of men in crew: | (a)
(b)
(c)
(d)
(e)
(f)
(g)
(h)
(i)
(j)
(k)
(l)
(m)
(n)
(o)
(p)
(q)
(r)
(s)
(t)
(u)
(v)
(w)
(x)
(y)
(z) | | | | | | |
| | (a)
(b)
(c)
(d)
(e)
(f)
(g)
(h)
(i)
(j)
(k)
(l)
(m)
(n)
(o)
(p)
(q)
(r)
(s)
(t)
(u)
(v)
(w)
(x)
(y)
(z) | | | | | | |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Salcm. | Salvador. | Santa Rosa. | Scajaguada. | Schuyler. |
|--|--|---|---|---|-----------------|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | \$1,090.00 | \$657.88 | \$2,390.00 | \$5,003.33 | |
| 21. Subsistence..... | 1.50 | 167.09 | 779.99 | 661.00 | \$12.84 |
| 22. Fuel..... | 352.80 | 187.09 | 906.26 | 1,035.51 | |
| 23. Supplies (machinery)..... | 89.15 | 15.12 | 119.92 | 97.49 | |
| 24. Repairs..... | | | | | |
| (a) Hull..... | 172.44 | 18.89 | | 300.70 | |
| (b) Machinery..... | 31.87 | 4.75 | 397.92 | 506.24 | |
| 25. Additions and alterations..... | | 15.15 | 190.85 | 177.95 | |
| 26. Miscellaneous..... | 5.65 | 141.97 | 343.16 | | |
| 27. Total..... | \$1,731.91 | \$1,022.35 | \$5,068.10 | \$6,402.82 | \$12.84 |
| 28. Approximate number of miles run during year..... | 2,117 | 5,072 | 2,976 | | 366 |
| 29. Number of days in commission..... | 347 | 321 | 242 | 245 | 365 |
| 30. Cost of fuel per gallon..... | 20 cents. | 15 cents. | \$0.20 | Average, 21.9 cents. | 24 cents. |
| | Remarks. | Remarks. | Remarks. | Remarks. | Remarks. |
| | Operated on Williamette River, above Portland, Oreg., being employed on light towage work and light towing at Williamette Falls and 3 months as tender to plant at Wheeland Dam. | Located at Plaquemine Lock; used for inspections and surveys and towing and as tender for dredge, as follows: Inspections of Bayou Plaquemine, Grosse Tete, and Chedoke; towing dredge, mine to Bayou Teche, landing dredge used on surveys on schooner Bayou Harvey Canal, Lake Pontchartrain, Lake Calcasieu, and on inspections and survey of Bayou Lalourche. | This plant was operated in Pensacola Harbor, Narrows in Santa Rosa Sound, Blackwater River, Carrabelle Bar and Harbor, St. Andrews Bay and Apalachicola River, Fla. During the month of December, 1916, was used by the quartermaster department, running between Pensacola, Fla., and Fort Barrancas, Pensacola, and McKee, Fla. | In Buffalo district for inspection of work by the division engineer and district officer. | |

| Name..... | Schuytlin. | Scorpion. | Semivole. | Sensor. | Seizant. |
|---|-------------------------|-------------------|-----------------------|--------------------|-----------------------|
| 1. District..... | Philadelphia, Pa. | Rock Island, Ill. | Chicago, Ill. | Savannah, Ga. | Dallas, Tex. |
| 2. When built..... | 1901. | Keokuk, Iowa. | Racine, Wis. | New York, N. Y. | Clinton, Ohio. |
| 3. When built..... | James C. Wignall & Son. | 1911. | 1913. | 1891. | 1906. |
| 4. Builder..... | 6 months. | United States. | Racine Boat Co. | Unknown. | Matthews Boat Co. |
| 5. Time to build..... | 6 months. | 6 months. | 3 months. | do. | |
| 6. When purchased..... | | | Racine, Wis. | New York, N. Y. | |
| 7. Where purchased..... | | | 1913. | 1902. | |
| 8. From whom purchased..... | | | Racine Boat Co. | Unknown. | |
| 9. Purchase price..... | \$6,000. | | \$2,228. | \$1,500. | \$1,528. |
| 10. Contract cost..... | \$6,000. | | \$2,228. | Unknown. | \$1,528. |
| 11. Complete cost with outfit..... | \$6,000. | \$812. | \$2,338. | do. | |
| 12. Present value..... | \$500. | \$802.11. | \$1,800. | \$1,200. | |
| 13. Hull: | | | | | |
| (a) Material of hull..... | Wood. | Wood. | Wood. | Wood. | Wood. |
| (b) Length over all..... | 54 feet. | 28 feet. | 36 feet 4 inches. | 40 feet. | 27 feet. |
| (c) Length on water line..... | 48 feet. | 27 feet. | 33 feet. | 33 feet 6 inches. | 26 feet 7 inches. |
| (d) Beam over all..... | 12 feet. | 5 feet. | 10 feet 6 inches. | 8 feet. | 6 feet. |
| (e) Beam on water line..... | 11 feet. | 4 feet 8 inches. | 9 feet. | 7 feet 6 inches. | 5 feet 6 inches. |
| (f) Depth of hull forward..... | 7 feet. | 3 feet 6 inches. | 5 feet 10 inches. | 5 feet. | 4 feet. |
| (g) Depth of hull amidships..... | 5 feet 3 inches. | 2 feet 10 inches. | 4 feet 3 inches. | 2 feet 9 inches. | 3 feet 4 inches. |
| (h) Depth of hull aft..... | 6 feet 8 inches. | 2 feet. | 4 feet 6 inches. | 4 feet. | 3 feet. |
| (i) Draft forward..... | 3 feet. | 1 foot 8 inches. | 2 feet. | 2 feet 6 inches. | 1 foot 2 inches. |
| (j) Draft at..... | 5 feet. | 2 feet. | 3 feet 6 inches. | 3 feet 8 inches. | 2 feet 6 inches. |
| (k) Draft to bottom of propeller..... | 4 feet 8 inches. | 1 foot 9 inches. | 3 feet 5 inches. | 2 feet 2 inches. | 2 feet 2 inches. |
| (l) Depth of keel from bottom of outside of planking..... | 4 inches. | 2½ inches. | 4½ inches. | | 4 feet. |
| (m) Displacement (long tons)..... | 16 tons. | 1.14 tons. | 2. | 7.3 tons. | 2. |
| (n) Speed in statute miles per hour..... | 9. | 10. | 8. | 9. | 8. |
| 14. House: | | | | | |
| (a) Length..... | 24 feet. | Nona. | 16 feet 4 inches. | 17 feet 10 inches. | 16 feet 4 inches. |
| (b) Width..... | 9 feet. | | 5 feet 9 inches. | 7 feet. | 5 feet 9 inches. |
| (c) Height above deck..... | 5 feet. | | 3 feet 2 inches. | 3 feet 7 inches. | 3 feet 2 inches. |
| (d) Accommodations..... | 8 men. | 5 persons. | Seating capacity, 10. | | Seating capacity, 10. |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Salcm. | Salvador. | Santa Rosa. | Scatoguada. | Schuyler. |
|--|---|--|---|---|-----------------|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | \$1,080.00 | \$657.88 | \$2,380.00 | \$8,003.33 | |
| 21. Subsistence..... | 1.50 | 1.50 | 779.99 | 641.60 | |
| 22. Fuel..... | 352.80 | 167.09 | 508.28 | 1,053.51 | \$12.84 |
| 23. Supplies (machinery)..... | 89.15 | 15.12 | 118.92 | 97.49 | |
| 24. Repairs..... | | | | | |
| (a) Hull..... | 172.44 | 18.89 | | 300.70 | |
| (b) Machinery..... | 31.87 | 4.75 | 397.62 | 606.24 | |
| 25. Additions and alterations..... | | 15.15 | 100.85 | 177.93 | |
| 26. Miscellaneous..... | 5.65 | 141.97 | 343.16 | | |
| 27. Total..... | \$1,731.91 | \$1,022.35 | \$5,098.10 | \$8,402.82 | \$12.84 |
| 28. Approximate number of miles run during year..... | 2,117 | 5,072 | 2,976 | | 369. |
| 29. Number of days in commission..... | 347 | 321 | 242 | 245 | 365. |
| 30. Cost of fuel per gallon..... | 20 cents. | 13 cents. | \$0.20 | Average, 21.9 cents. | 24 cents. |
| | Remarks. | Remarks. | Remarks. | Remarks. | Remarks. |
| | Operated on Willamette River, above Portland, Oreg., being employed in dispatch work and in towing at Willamette Falls and 3 months as tender to plant at Wheeland Dam. | Located at Plaquemine Lock; used for inspections and surveys and towing and as tender for dredge, as follows: Inspections of Bayou Plaquemine, Grosse Tete, and Chocaw, towing dredge; Grosse Tete from Plaquemine to Bayou Teeche, tending dredge; used on surveys on schooner Bayou, Harvey Canal, Lake Pontchartrain, Lake Calcasieu, and on inspections and survey of Bayou Lalourche. | This plant was operated in Pensacola Harbor, Narrows in Santa Rosa Sound, Blackwater River, Carabelle Bar and Harbor, St. Andrews Bay and Apalachicola River, Fla. During the month of December, 1916, was used by the quartermaster department, running between Pensacola, Fla., and Forts Barrancas, Pickens, and Meigs, Fla. | In Buffalo district for inspection of work by the division engineer and district officer. | |

| Name..... | Schuytlin. | Scorpion. | Seminole. | Seneca. | Sequoia. |
|---|-------------------------|-------------------|-----------------------|--------------------|-----------------------|
| 1. District..... | Philadelphia, Pa. | Rock Island, Ill. | Chicago, Ill. | Savannah, Ga. | Dallas, Tex. |
| 2. Where built..... | do. | Keokuk, Iowa. | Racine, Wis. | New York, N. Y. | Clinton, Ohio. |
| 3. When built..... | 1901. | 1911. | 1913. | 1891. | 1906. |
| 4. Builder..... | James C. Wignall & Son. | United States. | Racine Boat Co. | Unknown. | Mathews Boat Co. |
| 5. Time to build..... | 6 months. | 6 months. | 3 months. | do. | |
| 6. Where purchased..... | do. | do. | Racine, Wis. | do. | |
| 7. When purchased..... | do. | do. | 1913. | 1902. | |
| 8. From whom purchased..... | do. | do. | Racine Boat Co. | Unknown. | |
| 9. Purchase price..... | \$6,000. | | \$2,226. | \$1,500. | \$1,528. |
| 10. Contract cost..... | \$6,000. | | \$2,226. | Unknown. | \$1,528. |
| 11. Complete cost with outfit..... | \$812. | | \$2,336. | do. | |
| 12. Present value..... | \$500. | \$802.11. | \$1,800. | \$1,200. | |
| 13. Hull: | | | | | |
| (a) Material of hull..... | Wood. | Wood. | Wood. | Wood. | Wood. |
| (b) Length over all..... | 54 feet. | 28 feet. | 36 feet 4 inches. | 40 feet. | 27 feet. |
| (c) Length on water line..... | 48 feet. | 27 feet. | 33 feet. | 33 feet 6 inches. | 26 feet 7 inches. |
| (d) Beam over all..... | 12 feet. | 5 feet. | 10 feet 5 inches. | 8 feet. | 6 feet. |
| (e) Beam on water line..... | 11 feet. | 4 feet 8 inches. | 9 feet. | 7 feet 6 inches. | 5 feet 8 inches. |
| (f) Depth of hull forward..... | 7 feet. | 3 feet 6 inches. | 5 feet 10 inches. | 5 feet. | 4 feet. |
| (g) Depth of hull amidships..... | 5 feet 3 inches. | 2 feet 10 inches. | 4 feet 3 inches. | 2 feet 9 inches. | 3 feet 4 inches. |
| (h) Depth of hull aft..... | 6 feet 8 inches. | 2 feet. | 4 feet 6 inches. | 4 feet. | 3 feet. |
| (i) Draft forward..... | 3 feet. | 1 foot 8 inches. | 2 feet. | 2 feet 6 inches. | 1 foot 2 inches. |
| (j) Draft aft..... | 5 feet. | 2 feet. | 3 feet 6 inches. | 3 feet 8 inches. | 2 feet 6 inches. |
| (k) Draft to bottom of propeller..... | 4 feet 8 inches. | 1 foot 9 inches. | 3 feet 6 inches. | 2 feet 2 inches. | 2 feet 2 inches. |
| (l) Depth of keel from bottom of outside of planking..... | 4 inches. | 2½ inches. | 4½ inches. | | 4 feet. |
| (m) Displacement (long tons)..... | 16 tons. | 1.14 tons. | 2. | 7.3 tons. | 2. |
| (n) Speed in statute miles per hour..... | 9. | 10. | 8. | 9. | 8. |
| 14. House: | | | | | |
| (a) Length..... | 24 feet. | Nons. | 16 feet 4 inches. | 17 feet 10 inches. | 16 feet 4 inches. |
| (b) Width..... | 9 feet. | | 5 feet 9 inches. | 7 feet. | 5 feet 9 inches. |
| (c) Height above deck..... | 5 feet. | | 3 feet 2 inches. | 3 feet 7 inches. | 3 feet 2 inches. |
| (d) Accommodations..... | 8 men. | 5 persons. | Seating capacity, 10. | | Seating capacity, 10. |

TABLE XVII.—*Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Schuykill. | Scorpion. | Seminole. | Seneca. | Sequent. |
|---|--------------------|----------------------------------|----------------------|---------------------------------|-------------|
| 15. Motors: | | | | | |
| (a) Number..... | 1. | 1. | 1. | 1. | 1. |
| (b) Type..... | Gasoline, 4-cycle. | 4-cycle. | 3-cylinder, 4-cycle. | Internal exploded vs. kerosene. | 2-cycle. |
| (c) When built..... | 1908. | 1913. | 1910. | Unknown. | 1907. |
| (d) Make..... | Globe. | "Capitol," by Auto Engine Works. | Monarch. | Mits & Wells. | Fairbanks. |
| (e) Number of cylinders (1 engine). | 4. | 4. | 3. | 2. | 3. |
| (f) Diameter of cylinder. | 8½ inches. | 4½ inches. | 6 inches. | 8 inches. | 5½ inches. |
| (g) Stroke. | 10 inches. | 5½ inches. | 7 inches. | do. | Do. |
| (h) Revolutions per minute. | 320. | Up to 1,000. | 590. | 450. | 450. |
| (i) Rated brake horsepower. | 48. | 32. | 21. | 30. | 18. |
| (j) Weight of 1 motor. | 1,000 pounds. | 550 pounds. | 1,740 pounds. | 3,000 pounds. | 600 pounds. |
| 16. Propeller: | | | | | |
| (a) Number of blades. | 2. | 2. | 3. | 3. | 3. |
| (b) Diameter. | 42 inches. | 18 inches. | 24 inches. | 30 inches. | 24 inches. |
| (c) Pitch. | 54 inches. | do. | 36 inches. | do. | 26 inches. |
| (d) Diameter of shaft. | 3½ inches. | 1½ inches. | 1½ inches. | 2 inches. | 1½ inches. |
| 17. Heating system: | | | | | |
| (a) Type. | None. | None. | None. | None. | None. |
| (b) Size of heater. | do. | do. | do. | do. | do. |
| (c) Number of radiators. | do. | do. | do. | do. | do. |
| 18. Electric light plant: | | | | | |
| (a) Make. | None. | None. | None. | None. | None. |
| (b) Type of motor. | None. | None. | None. | None. | None. |
| (c) Brake horsepower. | None. | None. | None. | None. | None. |
| (d) Revolutions per minute. | None. | None. | None. | None. | None. |
| (e) Capacity of generator in kilowatts. | None. | None. | None. | None. | None. |
| (f) Number of lights. | None. | None. | None. | None. | None. |
| (g) Average candle-power per light. | None. | None. | None. | None. | None. |
| (h) Diameter of main shaft of motor. | None. | None. | None. | None. | None. |
| 19. Number of men in crew. | 3. | 1 launch man. | 1. | 1. | 1. |

4625

Digitized by Google

TABLE XVII.—*Report of operations of gasoline launches (crew) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Schuykill. | Scorpion. | Seminole. | Seneca. | Statent. |
|---|-------------------|----------------------------------|---------------------|-------------------------------|-------------|
| 15. Motors: | | | | | |
| (a) Number..... | 1. | 1. | 1. | 1. | 1. |
| (b) Type..... | Gasoline, 4-cycle | 4-cycle | 3-cylinder, 4-cycle | Internal explosive, kerosene. | 2-cycle. |
| (c) When built..... | 1908 | 1913 | 1910 | Unknown. | 1907 |
| (d) Make..... | Globe | "Capitol," by Auto Engine Works. | Monarch. | Mills & Wells. | Fairbanks. |
| (e) Number of cylinders (1 engine)..... | 4. | 4. | 3. | 2. | 3. |
| (f) Diameter of cylinder..... | 3½ inches. | 4½ inches. | 6 inches. | 8 inches. | 5½ inches. |
| (g) Strokes..... | 10 inches. | 5½ inches. | 7 inches. |do | Do. |
| (h) Revolutions per minute..... | 320. | Up to 1,000. | 520. | 450. | 450. |
| (i) Rated brake horsepower (total)..... | 45. | 22. | 21. | 30. | 18. |
| (j) Weight of 1 motor..... | 1,000 pounds. | 550 pounds. | 1,740 pounds. | 3,000 pounds. | 600 pounds. |
| 16. Propeller: | | | | | |
| (a) Number of blades..... | 2. | 2. | 3. | 3. | 3. |
| (b) Diameter..... | 42 inches. | 18 inches. | 24 inches. | 30 inches. | 24 inches. |
| (c) Pitch..... | 54 inches. | 1½ inches. | 20 inches. |do | 20 inches. |
| (d) Diameter of shaft..... | 3½ inches. | 1½ inches. | 1½ inches. | 2 inches. | 1½ inches. |
| 17. Heating system: | | | | | |
| (a) Type..... | | None. | | None. | |
| (b) Size of heater..... | | | | | |
| (c) Number of radiators..... | | | | | |
| 18. Electric light plant: | | | | | |
| (a) Make..... | | None. | | None. | |
| (b) Type of motor..... | | | | | |
| (c) Brake horsepower..... | | | | | |
| (d) Revolutions per minute..... | | | | | |
| (e) Capacity of generator in kilowatts..... | | | | | |
| (f) Number of lights..... | | | | | |
| (g) Average candlepower per light..... | | | | | |
| (h) Illumination per foot of beam..... | | | | | |
| 19. Number of men in crew..... | 3. | 1 launch man. | 1. | | |

| | | | | | | |
|--|-----------|----------|------------|---------------------------------|--|--|
| 20. Pay roll..... | \$80.00 | \$143.50 | \$380.00 | (1)
(1)
\$152.38
36.40 | | |
| 21. Subsistence..... | 90.86 | 63.98 | | | | |
| 22. Fuel..... | 2.55 | 140.00 | 220.00 | | | |
| 23. Supplies (machinery)..... | 14.70 | 14.57 | | | | |
| 24. Repairs..... | | | | | | |
| (6) Hull..... | | 131.85 | 213.00 | 125.66 | | |
| (6) Machinery..... | | 42.36 | 241.80 | 303.47 | | |
| 25. Additions and alterations..... | | 28.45 | | | | |
| 26. Miscellaneous..... | 8.25 | | 38.50 | 32.93 | | |
| 27. Total..... | | \$198.36 | \$1,591.30 | \$650.93 | | |
| 28. Approximate number of miles run during year..... | | 1,452 | 2,025 | | | |
| 29. Number of days in commission..... | None. | 123 | | Unknown. | | |
| 30. Cost of fuel per gallon..... | 17 cents. | \$0.186 | 181 cents. | Average cost, 7.8 cents. | | |
| <p><i>Remarks.</i></p> <p>The Schuykill has been out of commission the entire year, her place in survey work being taken by the cutter <i>Martin</i>.</p> <p>The expenses incurred above on the cost of wages of crew in breaking pipe connections and putting machinery in condition for "laying up." Other expenses covered cost of supplies furnished in December, 1915, and paid for in January, 1916.</p> | | | | | | |
| <p><i>Remarks.</i></p> <p>Between St. Paul and Winona, Minn.
At Fountain City.</p> | | | | | | |
| <p><i>Remarks.</i></p> <p>Used for miscellaneous survey work, towing, etc., Chicago and Calumet Rivers and harbors, Michigan City and Indiana Harbors, Ind.</p> | | | | | | |
| <p><i>Remarks.</i></p> <p>Used as tender to U. S. pipeline dredge <i>Augusta</i>. Cost of subsistence and wages for crew included in cost of operation of dredge.</p> | | | | | | |
| <p><i>Remarks.</i></p> <p>Boat laid up entire year. Condemned Dec. 1, 1916.</p> | | | | | | |

TABLE XVII.—*Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Shearwater. | Slonz. | Sitka. | Sisters, The. | Styposk. |
|--|------------------------------------|---------------------------|--------------------------------|------------------------------|-------------------------------|
| 1. District..... | Montgomery, Ala..... | Kansas City, Mo..... | Jacksonville, Fla..... | First, Cincinnati, Ohio..... | Norfolk, Va..... |
| 2. Where built..... | Pensacola Navy Yard..... | Grafton, Ill..... | do..... | Golconda, Ill..... | Camden, N. J..... |
| 3. When built..... | 1908..... | 1909..... | 1911..... | 1911..... | 1914..... |
| 4. Builder..... | United States Navy Department..... | Ripley Steel Boat Co..... | Al. McCabe..... | T. J. Abbott..... | Mathis Yacht Building Co..... |
| 5. Time to build..... | No record..... | No record..... | 2 months..... | Golconda, Ill..... | 5 months and 5 days..... |
| 6. Where purchased..... | Pensacola Navy Yard..... | Grafton, Ill..... | Jacksonville, Fla..... | 1914..... | Camden, N. J..... |
| 7. When purchased..... | 1912..... | 1909..... | 1911..... | 1914..... | 1914..... |
| 8. From whom purchased..... | United States Navy Department..... | Ripley Steel Boat Co..... | Al. McCabe..... | T. J. Abbott..... | Mathis Yacht Building Co..... |
| 9. Purchase price..... | \$900..... | \$387..... | \$1,450..... | \$275..... | \$13,487.50..... |
| 10. Contract cost..... | \$900..... | \$387..... | Included in contract cost..... | \$275..... | \$13,487.50..... |
| 11. Complete cost with outfit..... | \$900..... | \$387..... | Included in contract cost..... | \$275..... | \$13,487.50..... |
| 12. Present value..... | \$2,200..... | \$75..... | \$1,000..... | \$100..... | \$12,000..... |
| 13. Hull: | | | | | |
| (a) Material of hull..... | Wood (coppered)..... | Steel..... | Wood..... | Wood..... | Wood..... |
| (b) Length over all..... | 40 feet..... | 20 feet..... | 32 feet..... | 25 feet..... | 60 feet 1½ inches..... |
| (c) Length on water line..... | 37 feet..... | 20 feet..... | 30 feet 6 inches..... | 25 feet..... | 53 feet..... |
| (d) Beam over all..... | 8 feet..... | 5 feet..... | 7 feet..... | 4 feet 4 inches..... | 15 feet ½ inch..... |
| (e) Beam on water line..... | 7 feet..... | No record..... | 8 feet 7 inches..... | 4 feet 4 inches..... | 14 feet 6 inches..... |
| (f) Depth of hull forward..... | 6 feet 3 inches..... | do..... | 3 feet 7 inches..... | 3 feet..... | 9 feet 6 inches..... |
| (g) Depth of hull amidships..... | 6 feet..... | 2 feet 3 inches..... | 3 feet..... | 2 feet..... | 7 feet..... |
| (h) Depth of hull aft..... | 6 feet 1 inch..... | No record..... | 3 feet 2 inches..... | 2 feet 6 inches..... | 8 feet..... |
| (i) Draft forward..... | 3 feet..... | 1 foot..... | 1 foot 8 inches..... | 6 inches..... | 3 feet 7 inches..... |
| (j) Draft aft..... | 3 feet 3 inches..... | 2 feet 3 inches..... | 2 feet 10 inches..... | 4 inches..... | 5 feet 4 inches..... |
| (k) Draft to bottom of propeller..... | 2 feet 10 inches..... | 1 foot 8 inches..... | 2 feet 9 inches..... | 2 feet 6 inches..... | 4 feet 7 inches..... |
| (l) Depth of keel from bottom of outside of plating..... | 3 inches..... | No keel..... | 2 inches..... | 2 inches..... | 7½ inches..... |
| (m) Displacement (long tons)..... | 4..... | 2.4..... | 5..... | 0.5..... | 41..... |
| (n) Speed in statute miles per hour..... | 9..... | 7..... | 8..... | 15..... | 10..... |

| | | | | |
|---|-----------------------------|-------------------------|---------------------------------------|--------------------------|
| 14. House: | 30 feet. | None. | 15 feet. | 22 feet 3 inches. |
| (a) Length. | 6 feet. | | 6 feet. | 10 feet. |
| (b) Width. | 34 feet. | | 8 feet 6 inches. | 7 feet. |
| (c) Height above deck. | | | No bunks or toilet; chairs to seat 6. | 4 persons. |
| (d) Accommodations. | 4. | | | |
| 15. Motors: | | | | |
| (a) Number. | 1. | 1. | 1. | 1. |
| (b) Type. | Make-and-break; heavy duty. | 2-cycle; marine. | 4-cycle; medium duty. | 4-cycle; heavy duty. |
| (c) When built. | 1912. | No record. | 1913. | 1914. |
| (d) Make. | Buffalo Gasoline Motor Co. | Ferro. | Campbell Motor Co. | Globe Marine Engine. |
| (e) Number of cylinders (one engine). | 4. | 2. | 3. | 4. |
| (f) Diameter of cylinder. | 7 inches. | No record. | 54 inches. | 11 inches. |
| (g) Stroke. | 9 inches. | do. | 54 inches. | 14 inches. |
| (h) Revolutions per minute. | 350. | do. | 520. | 280. |
| (i) Rated brake horsepower (total). | 36. | do. | 21. | 110. |
| (j) Weight of one motor. | 3,400 pounds. | 700 pounds (estimated). | 650 pounds. | 14,500 pounds. |
| 16. Propeller: | | | | |
| (a) Number of blades. | 2. | 3. | 2. | 2. |
| (b) Diameter. | 38 inches. | 16 inches. | 24 inches. | 52 inches. |
| (c) Pitch. | do. | No record. | 26 inches. | 48 inches. |
| (d) Diameter of shaft. | 24 inches. | do. | 14 inches. | 54 inches. |
| 17. Heating system: | | | | |
| (a) Type. | None. | None. | None. | |
| (b) Size of heater. | | do. | do. | |
| (c) Number of radiators. | | do. | do. | |
| 18. Electric-light plant: | | | | |
| (a) Make. | | None. | do. | General Electric Co. |
| (b) Type of motor. | | | do. | 2-cycle gasoline engine. |
| (c) Brake horsepower. | | | do. | 2. |
| (d) Revolutions per minute. | | | do. | 1,200. |
| (e) Capacity of generator in kilowatts. | | | do. | 1. |
| (f) Number of lights. | | | do. | 13. |
| (g) Average candle-power per light. | | | do. | 12. |
| (h) Diameter of searchlight. | | | do. | 10 inches. |
| 19. Number of men in crew. | 2. | 1. | 1. | 3. |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Steamer. | Stow. | Status. | Stores, Tls. | Shipout. |
|-------------------------------|--|---|---|--------------------------------------|---|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | \$637.50 | | \$637.00 | | \$1,778.00 |
| 21. Subsistence..... | 192.04 | | (1) | | 2,484.81 |
| 22. Fuel..... | 823.05 | | 490.59 | | 247.18 |
| 23. Supplies (machinery)... | 97.42 | | 37.28 | | |
| 24. Repairs: | | | | | |
| (a) Hull..... | 68.80 | | 147.25 | | 281.46 |
| (b) Machinery..... | 20.63 | | 134.50 | \$17.80 | 679.51 |
| 25. Additions and altera- | | | | | 88.94 |
| tions..... | | | | | |
| 26. Miscellaneous..... | | | 124.36 | | 16.30 |
| Total..... | \$2,139.44 | | \$1,630.98 | \$17.80 | \$5,538.20 |
| 27. Approximate number | 3,060 | | 2,945 ¹ | | 7,200. |
| of miles run during | | | | | |
| year..... | | | 365 | None | 365. |
| 29. Number of days in com- | 181 | | 184 to 25 cents. | | 23.2 cents. |
| mission..... | | | | | |
| 30. Cost of fuel per gallon.. | \$0.225. | | | | |
| | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> |
| | This plant was employed as tender for U. S. dredge Blackwater and operated in the narrows in Santa Rosa Sound, Blackwater River, Apalachicola Bay and channel from Apalachicola River to St. Andrews Bay, Fla. | Located at Sioux Ice Harbor, S. Dak., on Missouri River. Not operated during year; very poor condition. | As tender for the dredge Florida on the improvement of the St. Johns River, Indian River, and the channel between St. Johns River and Cumberland Sound, Ga. and Fla., and as a survey boat on the same waters.
¹ Subsistence furnished by dredge or survey party to which attached. | Not in use. Hull entirely worthless. | Operated on inland waterway, Norfolk, Va., to Beaufort Inlet, N. C. |

| Name | Spry. | Spry. | Stadia. | Starvation. | Stewert. |
|---|-----------------------------|---------------------------|------------------------|-----------------------|-----------------------|
| 1. District..... | Savannah, Ga. | Wilmington, N. C. | New Orleans, La. | Norfolk, Va. | St. Louis, Mo. |
| 2. Where built..... | Morris Heights, N. Y. | Unknown | New York, N. Y. | Rosnoke Island, N. C. | Grafton, Ill. |
| 3. When built..... | 1908 | Unknown | 1894 | 1913 | 1909 |
| 4. Builder..... | New York Yacht & Engine Co. | do. | Unknown | W. O. Dough. | Ripley Steel Boat Co. |
| 5. Time to build..... | Unknown | do. | do. | 30 days | 7 weeks. |
| 6. Where purchased..... | New York, N. Y. | Engine installed in yawl. | New York, N. Y. | Manteo, N. C. | |
| 7. When purchased..... | 1909 | | 1894 | 1913 | |
| 8. From whom purchased..... | Cox & Stevens | Gas Engine Power Co. | Gas Engine Power Co. | W. O. Dough. | |
| 9. Purchase price..... | \$4,800 | | \$1,844.50 | \$350 | \$519. |
| 10. Contract cost..... | Unknown | | \$1,844.50 | \$375 | \$519. |
| 11. Complete cost with outfit..... | \$5,100 | | | | |
| 12. Present value..... | \$3,500 | \$60 | About \$600 | \$290 | \$325. |
| 13. Full: | | | | | |
| (a) Material of hull..... | Wood | Wood | Wood | Wood | Steel. |
| (b) Length over all..... | 45 feet 6 inches | 18 feet 6 inches | 30 feet 4 inches | 22 feet 6 inches | 28 feet. |
| (c) Length on water line..... | 40 feet | 17 feet 6 inches | 27 feet 8 inches | 21 feet | 27 feet. |
| (d) Beam over all..... | 11 feet | 6 feet | 6 feet 7 inches | 6 feet 6 inches | 6 feet 6 inches. |
| (e) Beam on water line..... | 10 feet 1 inch | 5 feet 4 inches | 6 feet 5 inches | 5 feet | 5 feet 11 inches. |
| (f) Depth of hull forward..... | 7 feet 4 inches | 3 feet 8 inches | 3 feet 5 inches | 3 feet 6 inches | 2 feet 8 inches. |
| (g) Depth of hull amidships..... | 7 feet 6 inches | 2 feet | 2 feet 11 inches | 2 feet 6 inches | 2 feet 6 inches. |
| (h) Depth of hull aft..... | 7 feet 2 inches | 1 foot 6 inches | 3 feet 3 inches | 2 feet 9 inches | 2 feet 5 inches. |
| (i) Draft forward..... | 2 feet 10 inches | 1 foot 2 inches | 1 foot 4 inches | 1 foot 6 inches | 4½ inches. |
| (j) Draft aft..... | 3 feet 7 inches | 2 feet 2 inches | 2 feet 7 inches | 1 foot 6 inches | 1 foot 6 inches. |
| (k) Draft to bottom of propeller..... | 3 feet 4 inches | 1 foot 11 inches | 2 feet 5 inches | 2 feet | 1 foot 6 inches. |
| (l) Depth of keel from bottom of outside of planking..... | 6 inches | 3 inches | 6 inches | 6 inches | ½ inch. |
| (m) Displacement (long tons). | 12.5 | 2 | 5 | 1 | 1½ |
| (n) Speed in statute miles per hour. | 9.5 | 5 | 7½ | 7½ | 8. |
| 14. House: | | | | | |
| (a) Length..... | 22 feet 11 inches | No house. | 20.5 feet | None. | None. |
| (b) Width..... | 7 feet 10 inches | | 6.4 feet | | |
| (c) Height above deck..... | 2 feet 3 inches | | 2.5 feet | | |
| (d) Accommodations | 6 persons. | | Seating capacity of 10 | | |

TABLE XVII.—*Report of operations of gasoline launches (crew) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Spry. | Spry. | Stadia. | Starvation. | Seawort. |
|---|------------------------------------|---------------------------|--------------|------------------------------------|-------------|
| 15. Motors: | | | | | |
| (a) Number..... | 1..... | 1..... | 1..... | 1..... | 1..... |
| (b) Type..... | 4-cycle, kerosene, medium-duty. | 2-cycle, single-cylinder. | Marine. | 2-cycle. | 2-cycle. |
| (c) When built..... | 1904. | Unknown. | Unknown. | 1913. | 1909. |
| (d) Make..... | Regal Gasoline Engine Co. | Marine Motor Works. | Downs, H. O. | Marine Motor Works Stamford, Conn. | Ferro. |
| (e) Number of cylinders (1 each)..... | 4..... | 1..... | 2..... | 1..... | 2..... |
| (f) Diameter of cylinder..... | 6½ inches. | 4½ inches. | 5 inches. | 5½ inches. | 5 inches. |
| (g) Stroke..... | 7 inches. | 5 inches. | 6 inches. | 6 inches. | Do. |
| (h) Revolutions per minute..... | 400. | 300. | 375. | 400. | 600. |
| (i) Rated brake horsepower..... | 28. | 5. | 10. | 7½. | 15. |
| (j) Weight of 1 motor..... | 2,500 pounds. | 300 pounds. | Unknown. | 415 pounds. | 475 pounds. |
| 16. Propeller: | | | | | |
| (a) Number of blades..... | 3..... | 2..... | 3..... | 2..... | 2..... |
| (b) Diameter..... | 34 inches. | 18 inches. | 22 inches. | 21 inches. | 20 inches. |
| (c) Pitch..... | do. | do. | do. | 24 inches. | Do. |
| (d) Diameter of shaft..... | 2 inches. | 1 inch. | 1½ inches. | 1½ inches. | 1½ inches. |
| 17. Heating system: | | | | | |
| (a) Type..... | None. | None. | None. | None. | None. |
| (b) Size of boiler..... | | | | | |
| (c) Number of radiators..... | | | | | |
| 18. Electric-light plant: | | | | | |
| (a) Make..... | Exide storage battery with dynamo. | None. | | None. | None. |
| (b) Type of motor..... | Direct current. | | | | |
| (c) Brake horsepower..... | Unknown. | | | | |
| (d) Revolutions per minute..... | 1,200. | | | | |
| (e) Capacity of generator in kilowatts..... | 94 watts. | | | | |
| (f) Number of lights..... | 8. | | | | |
| (g) A. C. or D. C. power per light..... | 18. | | | | |

Apple dynamo, 5-ampere, 7-volt, 1,100 speed.

FLOATING PLANT.

4631

| (A) Diameter of searchlight. | None. | 1. | None. | None. | 6 inches. |
|--|---|--|---|---|--|
| 19. Number of men in crew | 2. | 1. | 1. | 1. | 1. |
| OPERATING COST. | | | | | |
| 20. Pay roll..... | \$1,450.00 | \$380.00 | | \$243.00 | (1) |
| 21. Substances..... | 1,392.65 | | | 178.00 | \$40.00 |
| 22. Fuel..... | 1,198.77 | 158.50 | \$105.00 | 18.40 | 17.80 |
| 23. Supplies (machinery)..... | 98.37 | 37.34 | | | |
| 24. Repairs: | | | | | |
| (a) Hull..... | 12.44 | 60.92 | 3.00 | 75.80 | |
| (b) Machinery..... | 284.34 | 67.25 | 1.00 | 48.15 | |
| 25. Additions and alterations..... | 1.85 | | | 5.72 | |
| 26. Miscellaneous..... | 300.74 | 13.54 | 15.90 | 11.19 | |
| 27. Total..... | \$2,725.16 | \$695.55 | | \$577.28 | |
| 28. Approximate number of miles run during year..... | 3,971. | 2,550. | 3,300. | 1,400. | 264. |
| 29. Number of days in commission..... | Unknown. | 175. | 68. | 180. | 51. |
| 30. Cost of fuel per gallon..... | Average cost gasoline 13.8 cents and kerosene 6.6 cents. | \$0.24— | 14 cents. | 24.2 cents. | 19 to 21 cents per gallon. |
| | Remarks. | Remarks. | Remarks. | Remarks. | Remarks. |
| | Used for inspection of improvements throughout district; also for sounding work and bar surveys. No regular subsistence allowed. 1,941 gallons of gasoline and 1,010 gallons of kerosene. | This launch was used for transferring men and material between Wilmington and the United States yard. Was practically put out of commission on Sept. 15, 1916. | Launch Stadla was in service at Schooner Bayou Lock for carrying and towing necessary material and supplies for repairs and upkeep of lock. | Operated on inland waterway, Norfolk, Va., to Beaufort Inlet, N. C. | Tender to snagboat J. N. Macomb; has no regular crew, but is operated by men taken from crew of the snagboat Macomb. |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name | Sub Rosa. | Suisun. | Tarascon. | Tre-Rec. | Totol. |
|--|---------------------------------|---------------------------------------|-------------------|-----------------------|---------------------------------|
| 1. District | Montgomery, Ala. | First San Francisco, Cal. | Louisville, Ky. | Charleston, S. C. | Jacksonville, Fla. |
| 2. When built | Pensacola Navy Yard. | Astoria, Oreg. | Salem, Ohio. | Mount Pleasant, S. C. | Salem, Ohio. |
| 3. Builder | 1908. | 1913-14. | 1915. | 1907. | 1913. |
| 4. Builder | U. S. Navy Department | Wilson Bros. | W. H. Mullins Co. | E. O. Hall | W. H. Mullins Co. |
| 5. Time to build | 1 month. | 10 months. | Unknown. | 3 months. | Not known. |
| 6. Where purchased | Pensacola Navy Yard. | Not purchased. | Salem, Ohio. | Charleston, S. C. | Salem, Ohio. |
| 7. When purchased | 1908. | | 1915. | October 1911. | 1913. |
| 8. From whom purchased. | U. S. Navy Department | | W. H. Mullins Co. | E. O. Hall. | W. H. Mullins Co. |
| 9. Purchase price. | Included in cost of Santa Rosa. | | \$1,120. | \$300. | \$137. |
| 10. Contract cost. | | \$24,952.40. | | \$400. | * |
| 11. Complete cost with outfit. | | \$35,000. | \$1,120. | \$315. | \$137. |
| 12. Present value. | | \$35,000. | \$900. | \$200. | \$100. |
| 13. Hull. | | | | | |
| (a) Material of hull | Wood | Wood, copper-sheathed. | Steel | Cypress and pine. | Pressed steel, No. 20, B. W. G. |
| (b) Length over all | 11 feet. | 85 feet 9 inches. | 28 feet 5 inches. | 31 feet. | 16 feet 10 inches. |
| (c) Length on water | 13 feet 6 inches. | 79 feet 8 inches. | 26 feet. | 31 feet. | 16 feet 5 inches. |
| (d) Beam over all | 4 feet. | 16 feet 6 inches. | 6 feet 1 inch. | 6 feet 6 inches. | 4 feet 1 inch. |
| (e) Beam on water | 4 feet. | 15 feet 6 inches. | 5 feet 8 inches. | 5 feet 9 inches. | 3 feet 4 inches. |
| (f) Depth of hull forward | 2 feet 3 inches. | 10 feet 5 inches. | 2 feet 6 inches. | 2 feet 10 inches. | 2 feet 4 inches. |
| (g) Depth of hull amidships | 1 foot 8 inches. | 9 feet 6 inches. | 2 feet 2½ inches. | 2 feet 4 inches. | 1 foot 9 inches. |
| (h) Depth of hull aft | 2 feet. | 10 feet 2 inches. | 1 foot 8 inches. | 2 feet. | 1 foot 2 inches. |
| (i) Draft forward | 6 inches. | 4 feet 8 inches. | 1 foot 3 inches. | 6 inches. | 3 inches. |
| (j) Draft aft | 9 inches. | 5 feet 8 inches. | 1½ inches. | 2 feet. | 1 foot 4 inches. |
| (k) Draft to bottom of propeller | 11 inches. | 5 feet 4 inches. | 2 feet 1 inch. | 1 foot 5 inches. | 1 foot 2 inches. |
| (l) Depth of keel from bottom of outside of planking | 13 inches. | 5 inches. | 1 inch. | 2 feet. | 1½ inches. |
| (m) Displacement (long tons) | 0.4. | 73. | 1.06. | 2. | 0.24. |
| (n) Speed in statute miles per hour. | 4.5. | 12. | 13. | 10. | 7. |
| 14. Mains: | | | | | |
| (a) Length. | None. | Pilot house, 11 feet; trunk, 41 feet. | None. | None. | None. |
| (b) Width. | | 11 feet. | | | |

| | | | | | |
|---|---|---|----------------------|--|-----------------------------|
| (c) Height above deck. | Pilot house, 7 feet 2 inches; trunk, 2 feet 6 inches. | | | | |
| (d) Accommodations. | Sleeping, 16. | | | | |
| 15. Motors. | | | | | |
| (a) Number. | 1. | 1. | 4-cylinder, 4-cycle. | 1. | 2-cycle, type "p." |
| (b) Type. | Make-and-break. | | | | |
| (c) When built. | 1910. | | Not known. | 1908. | 1913. |
| (d) Make. | Buffalo Gasoline Motor Co. | | Corliss. | Ferro. | Ferro Machine & Foundry Co. |
| (e) Number of cylinders (one engine). | 2. | 6. | | 3. | 1. |
| (f) Diameter of cylinder. | 2½ inches. | 10½ inches. | 4½ inches. | 4 inches. | 3½ inches. |
| (g) Stroke. | 4 inches. | 12 inches. | 4½ inches. |do | 3½ inches. |
| (h) Revolutions per minute. | 350 to 400. | 312. | 700. | 750. | 732. |
| (i) Rated brake horsepower (total). | 2. | 175. | 40. | 17. | 3. |
| (j) Weight of one motor. | 135 pounds. | 12 tons. | | 500 pounds. | 185 pounds. |
| 16. Propeller. | | | | | |
| (a) Number of blades. | 3. | 3. | 3. | 3. | 3. |
| (b) Diameter. | 9 inches. | 54 inches. | 18 inches. | 18 inches. | 11 inches. |
| (c) Pitch. | 18 inches. | 51 inches. | 27 inches. | 24 inches. | 12 inches. |
| (d) Diameter of shaft. | ½ inch. | 4 inches. | 1½ inches. | 1½ inches. | ¾ inch. |
| 17. Heating system: | | | | | |
| (a) Type. | None. | Hot-water Triumph. | None. | None. | None. |
| (b) Size of heater. | | Grate, 14 inches diameter and 38 inches high. | | | Do. |
| (c) Number of radiators. | 3. | 3. | | | Do. |
| 18. Electric-light plant: | | | | | |
| (a) Make. | None. | General Electric. | None. | None. | Do. |
| (b) Type of motor. | | Internal combustion, gasoline, 2-cycle. | | | Do. |
| (c) Brake horsepower. | 2. | | | | Do. |
| (d) Revolutions per minute. | 1,200. | | | | Do. |
| (e) Capacity of generator in kilowatts. | 1. | | | | Do. |
| (f) Number of lights. | | | | | Do. |
| (g) Average candle-power per light. | 32. | | | | Do. |
| (h) Diameter of searchlight. | 12. | | | | Do. |
| (i) Number of men in crew. | 8 inches. | | | | Do. |
| 19. Number of men in crew. | 5. | 1. | | No regular crew. run by man from dredge. | |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Sub Ros. | Subsun. | Tarason. | Tee-Rec. | Teeol. |
|--|---|--|---|--|--|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | | \$5,619.32 | \$704.79 | | (1) |
| 21. Subsidence..... | | 1,642.39 | 222.48 | \$211.47 | (2) |
| 22. Fuel..... | \$10.40 | 1,073.07 | 54.38 | 17.87 | |
| 23. Supplies (machinery)..... | | 131.00 | | | |
| 24. Repairs: | | | | | |
| (a) Hull..... | | 1,323.32 | 94.97 | | |
| (b) Machinery..... | | 813.77 | 307.41 | 4.25 | |
| 25. Additions and alterations..... | | 68.77 | 79.44 | 15.84 | |
| 26. Miscellaneous..... | | 655.26 | .28 | | |
| 27. Total..... | \$10.40 | \$11,326.90 | \$1,523.75 | | |
| 28. Approximate number of miles run during year..... | 160..... | 6,080..... | 4,364..... | 1,800 miles..... | No record. |
| 29. Number of days in commission..... | 36..... | 331..... | 245..... | 346..... | Entire year. |
| 30. Cost of fuel per gallon..... | \$0.20..... | Gasoline, \$0.119, average; distillate, \$0.0616, average. | 17, 19, 20, and 21 cents..... | 24 cents..... | No record. |
| | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> |
| | This plant was used as a tender to the U. S. schooner Santa Rosa, having no regular duty and making only special trips when necessary, being operated by one of the Santa Rosa crew detailed for the purpose. | This vessel was used in patrolling San Francisco Bay, Oakland Harbor, San Pablo Bay, Suisun Bay, Petaluma Creek, Napa River, etc., to prevent illegal dumping in navigable waters or other infractions of rules and regulations for the preservation of Government improvements, as well as to enforce War Department rules regarding the use of fishing nets in the navigable waters of this district. The boat was also used for inspection of private works under construction and Government work on harbor improvements under contract. | Louisville - & Portland Canal; maneuvering dam, and transferring employees and materials. | Operated on Congaree River, S. C. Used as tender to U. S. pipeline dredge barges, conveying mail, supplies, handling barges and for survey work. | Tender for U. S. motor survey boat Capt. J. J. Meyer; no extra crew required, nor cost of operation incurred. Barely used. The fuel used was from supply of the Meyer, and no separate record was kept.
1 None.
2 No record. |

| Name..... | Tomahawk. | Trenton. | Trimble. | Ucker. | Vamos. |
|---|-------------------|--|-------------------------|-----------------------|---------------------------------|
| 1. District..... | Kansas City, Mo. | Philadelphia, Pa. | Rock Island, Ill. | Savannah, Ga. | Rock Island, Ill. |
| 2. Where built..... | Gasconade, Mo. | Holly Oak, Del. | St. Paul, Minn. | Jacksonville, Fla. | Red Wing, Minn. |
| 3. When built..... | 1915. | 1912. | 1913. | 1914. | 1908. |
| 4. Builder..... | United States. | George C. Morris. | Jos. Dingie Boat Works. | Unknown. | Red Wing Boat Manufacturing Co. |
| 5. Time to build..... | 21 days. | 2 months. | 2 months. | do. | |
| 6. Where purchased..... | | | St. Paul, Minn. | Brunswick, Ga. | Red Wing, Minn. |
| 7. When purchased..... | | | 1913. | 1915. | 1908. |
| 8. From whom purchased..... | | | Jos. Dingie Boat Works. | Glynn Canning Co. | Red Wing Boat Manufacturing Co. |
| 9. Purchase price..... | | | \$1,724. | \$381. | \$1,975. |
| 10. Contract cost..... | \$384.20. | \$992. | \$1,724. | Unknown. | \$1,975. |
| 11. Complete cost with outfit..... | \$397.36. | \$992. | \$1,724. | \$381. | \$1,975. |
| 12. Present value..... | \$225. | \$900. | \$795.46. | \$300. | \$416.77. |
| 13. Hull: | | | | | |
| (a) Material of hull..... | Wood. | Wood. | Wood. | Steel. | Cypress. |
| (b) Length over all..... | 22 feet 6 inches. | 28 feet. | 33 feet. | 24 feet. | 31 feet. |
| (c) Length on water line..... | 19 feet 6 inches. | 24 feet. | 34 feet 6 inches. | 23 feet. | 30 feet. |
| (d) Beam over all..... | 5 feet 6 inches. | 8 feet. | 5 feet 10 inches. | 5 feet 11 inches. | 7 feet. |
| (e) Beam on water line..... | 5 feet 6 inches. | 7 feet 4 inches. | 5 feet 8 inches. | 4 feet 7 1/2 inches. | 7 feet. |
| (f) Depth of hull forward..... | 7 1/2 inches. | 5 feet. | 3 feet 6 inches. | 2 feet 10 inches. | 5 feet. |
| (g) Depth of hull amidships..... | 2 feet 4 inches. | 3 feet 8 inches. | 3 feet 1/2 inch. | 2 feet 4 inches. | 3 feet. |
| (h) Depth of hull aft..... | 1 foot 11 inches. | 2 feet 6 inches. | 2 feet 2 1/2 inches. | 2 feet. | 2 feet 9 inches. |
| (i) Draft forward..... | 6 inches. | 10 inches. | 10 inches. | 1 foot. | 1 foot. |
| (j) Draft aft..... | 8 inches. | 3 feet. | 2 inches. | 1 foot. | 2 feet 2 inches. |
| (k) Draft to bottom of propeller..... | 1 foot 7 inches. | 2 feet 6 inches. | 2 feet 1 inch. | 2 feet. | 2 feet 2 inches. |
| (l) Depth of keel from bottom of outside of planking..... | No keel. | Forward, 3 inches; amidship, 6 inches; aft, 24 inches. | 14 inches. | 2 inches. | 1 foot 4 inches. |
| (m) Displacement (long tons)..... | 1.5. | 44. | 14. | 1.5. | 14. |
| (n) Speed in statute miles per hour..... | 8. | 9. | 14. | 8. | 7. |
| 14. House: | | | | | |
| (a) Length..... | None. | None. | None (Kenyon Auto top). | 15 feet 7 1/2 inches. | 21 feet. |
| (b) Width..... | | | | 4 feet. | 7 feet. |
| (c) Height above deck..... | | | | do. | 4 feet. |
| (d) Accommodations..... | | | Seating capacity, 8. | | Seats 10 persons. |

TABLE XVII.—*Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Tomahawk. | Trenton. | Trimblett. | Uchee. | Yamac. |
|---|---|-------------------------------------|--|--------------------|---------------|
| 15. Motors: | | | | | |
| (a) Number..... | 1..... | 1..... | 1..... | 1..... | 1..... |
| (b) Type..... | 4-cycle, marine. | Gasoline, 4-cycle. | Auto marine, 4-cycle. | 2-cycle, gasoline. | 4-cycle. |
| (c) When built..... | 1915. | 1912. | 1913. | 1914. | |
| (d) Make..... | Gray. | Harris Engine Co., Wilmington, Del. | "Capitol" Auto Engine Works, St. Paul, Minn. | Gray. | Red wing. |
| (e) Number of cylinders (one engine)..... | 4..... | 2..... | 4..... | 1..... | 4..... |
| (f) Diameter of cylinder..... | 3½ inches. | 6 inches. | 5½ inches. | 5½ inches. | 5 inches. |
| (g) Stroke..... | 4½ inches. | 7 inches. | 6 inches. | 5 inches. | 6 inches. |
| (h) Revolutions per minute. | 700 to 1,300. | 550. | 940. | 600. | Up to 650. |
| (i) Rated brake horsepower (C.G.S.). | 20 to 24. | 14. | 40. | 12. | 24. |
| (j) Weight of one motor. | 550 pounds (including clutch and magnet). | 900 pounds. | 750 pounds. | 250 pounds. | 1,000 pounds. |
| 16. Propeller: | | | | | |
| (a) Number of blades. | 3..... | 3..... | 3..... | 3..... | 3..... |
| (b) Diameter..... | 18 inches. | 22 inches. | 19 inches. | 16 inches. | 20 inches. |
| (c) Pitch..... | 22 inches. | 27 inches. | 26 inches. | 32 inches. | 23 inches. |
| (d) Diameter of shaft. | 1½ inches. | 1½ inches. | 1½ inches. | 1 inch. | 1½ inches. |
| 17. Heating system: | | | | | |
| (a) Type..... | None. | None. | None. | None. | |
| (b) Size of heater. | | | | | |
| (c) Number of radiators. | | | | | |
| 18. Electric-light plant: | | | | | |
| (a) Make..... | None. | | Storage battery. | None. | |
| (b) Type of motor. | | | | | |
| (c) Brake horsepower. | | | | | |
| (d) Revolutions per minute. | | | | | |
| (e) Capacity of generator in kilowatts. | | | | | |
| (f) Number of lights. | | | | | |

| (g) Average candle-power per light. | | (h) Diameter of searchlight. | | 19. Number of men in crew. | | 9 inches. | |
|--|--|--|--|----------------------------|--|-----------|--------------------|
| 1. | | 1. | | 1. | | 1. | |
| OPERATING COST. | | No regular crew | | 1 | | 1 | |
| 20. Pay roll. | \$244.00 | | | | | | |
| 21. Subsistence. | 104.00 | | | | | | |
| 22. Fuel. | 107.33 | \$323.67 | \$344.00 | | | \$46.64 | |
| 23. Supplies (machinery). | 3.52 | 10.13 | 9.19 | | | 13.26 | |
| 24. Repairs: | | | | | | | |
| (a) Hull. | | | 5.10 | | | | |
| (b) Machinery. | 6.93 | | 13.66 | | | 61.30 | |
| 25. Additions and alterations. | 16.00 | | 16.50 | | | | |
| 26. Miscellaneous. | 10.32 | 1.00 | | | | 19.90 | |
| 27. Total. | \$612.10 | | | | | | |
| 28. Approximate number of miles run during year. | 2,896 | 7,569 | \$340.50 | 5,016 | 744 | \$140.10 | |
| 29. Number of days in commission. | 166 | 276 | | 171 | Unknown. | | |
| 30. Cost of fuel per gallon. | 18 cents | 22 cents (average) | | \$0.18625 | 24.5 cents | | |
| | Remarks. | Remarks. | Remarks. | Remarks. | Remarks. | Remarks. | Remarks. |
| | Operated on Missouri River (Kansas City to mouth), in connection with survey boat Katherine; dispatch service. | In Delaware River above and below Philadelphia, Pa., as a tender to U. S. rehandling machine Cataract. | Inspection boat between Lock No. 1 and Lake Pepin, vicinity of St. Paul, Minn. | | Used for inspection purposes on Savannah River at and below Augusta, Ga. | | Not in commission. |

TABLE XVII.—*Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | Tomahawk. | Trenton. | Trimbell. | Vchee. | Venue. |
|---|---|-------------------------------------|--|-------------------|---------------|
| 15. Motors: | | | | | |
| (a) Number..... | 1..... | 1..... | 1..... | 1..... | 1..... |
| (b) Type..... | 4-cycle, marine | Gasoline, 4-cycle | Auto marine, 4-cycle | 2-cycle, gasoline | 4-cycle. |
| (c) When built..... | 1915. | 1912. | 1913. | 1914. | |
| (d) Make..... | Gray. | Harris Engine Co., Wilmington, Del. | "Capitol" Auto Engine Works, St. Paul, Minn. | Gray. | Red wing. |
| (e) Number of cylinders (one engine)..... | 4..... | 2..... | 4..... | 1..... | 4..... |
| (f) Diameter of cylinder..... | 3½ inches. | 6 inches. | 5½ inches. | 5½ inches. | 5 inches. |
| (g) Stroke..... | 4½ inches. | 7 inches. | 6 inches. | 5 inches. | 6 inches. |
| (h) Revolutions per minute..... | 700 to 1,200. | 550. | 940. | 600. | Up to 650. |
| (i) Rated brake horsepower (total)..... | 20 to 24. | 14. | 40. | 12. | 24. |
| (j) Weight of one motor..... | 550 pounds (including clutch and magnet). | 900 pounds. | 750 pounds. | 250 pounds. | 1,000 pounds. |
| 16. Propeller: | | | | | |
| (a) Number of blades..... | 3..... | 3..... | 3..... | 3..... | 3..... |
| (b) Diameter..... | 18 inches. | 22 inches. | 19 inches. | 16 inches. | 20 inches. |
| (c) Pitch..... | 22 inches. | 27 inches. | 28 inches. | 22 inches. | 28 inches. |
| (d) Diameter of shaft..... | 1½ inches. | 1½ inches. | 1½ inches. | 1 inch. | 1½ inches. |
| 17. Heating system: | | | | | |
| (a) Type..... | None. | | None. | None. | |
| (b) Size of heater..... | | | | | |
| (c) Number of radiators..... | | | | | |
| 18. Electric-light plant: | | | | | |
| (a) Make..... | None. | | Storage battery. | None. | |
| (b) Type of motor..... | | | | | |
| (c) Brake horsepower..... | | | | | |
| (d) Revolutions per minute..... | | | | | |
| (e) Capacity of generator in kilowatts..... | | | | | |
| (f) Number of lights..... | | | | | |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| (g) Average candle-power per light. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Vernon. | Victoria. | Vigilant. | Violetta. | Viper. |
|---|------------------------|-------------------|--|---------------------------------|---|
| 1. District..... | Montgomery, Ala. | Galveston, Tex. | Second, Portland, Oreg. | Jacksonville, Fla. | Rock Island, Ill. |
| 2. Where built..... | Reed, W. Va. | 1915 do. | Eagle Harbor, Wash. | Brooklyn, N. Y. | Kokotuk, Iowa. |
| 3. When built..... | 1912 | 1915 | J. W. Hall. | 1902. | 1909. |
| 4. Builder..... | Reedine Motor Boat Co. | U. S. F. D. | 90 days. | | M. Melges United States civil engineer. |
| 5. Time to build..... | No record. | | | | 6 months. |
| 6. Where purchased..... | Reedine, W. Va. | | | | |
| 7. When purchased..... | 1912 | | | | |
| 8. From whom purchased..... | Reedine Motor Boat Co. | | | | |
| 9. Purchase price..... | \$208. | | \$6,900. | \$1,000. | \$800. |
| 10. Contract cost..... | \$250. | \$2,800. | \$9,400. | Included in contract cost. | \$800. |
| 11. Complete cost with outfit..... | \$250. | | | | |
| 12. Present value..... | \$175. | \$2,000. | \$3,900. | \$1,000. | \$528.70. |
| 13. Hull: | | | | | |
| (a) Material of hull..... | Wood | Wood | Wood | Wood | Wood |
| (b) Length over all..... | 15 feet | 34 feet | 53 feet 3 inches | 24 feet | 28 feet |
| (c) Length on water line..... | 14 feet | 32 feet 8 inches | 50 feet 9 inches | 25 feet | 27 feet 3 inches |
| (d) Beam over all..... | 4 feet | 9 feet | 12 feet | 11 feet 4 inches | 4 feet 6 inches |
| (e) Beam on water line..... | 3 feet 8 inches | 7 feet 8 inches | 10 feet 3 inches | 10 feet 7 inches | 3 feet 7 inches |
| (f) Depth of hull forward..... | 2 feet 3 inches | 5 feet 6 inches | 7 feet 6 inches | Spoon bow. | 3 feet 7 inches |
| (g) Depth of hull amidships..... | 1 foot 9 inches | 5 feet 2 inches | 7 feet 6 inches | 4 feet 4 inches | 2 feet 6 inches |
| (h) Depth of hull aft..... | 1 foot 5 inches | 2 feet 10 inches | 3 feet 3 inches | 3 feet | 1 foot 10½ inches |
| (i) Draft forward..... | 5 inches | 2 feet | 4 feet 1 inch | Spoon bow. | 1 foot. |
| (j) Draft amidships..... | 1 foot 4 inches | 3 feet 3 inches | 4 feet 3 inches | 4 feet | 2 feet 4½ inches |
| (k) Draft to bottom of propeller..... | 1 foot 6 inches | 3 feet | 3 feet | 3 feet (estimated) | 2 feet. |
| (l) Depth of keel from bottom of outside of planking..... | 4½ inches | 1 foot 2 inches | 9 inches forward, 2 feet 9 inches aft. | 2 inches | 1½ inches. |
| (m) Displacement (long tons). | 1. | 11 tons. | 22. | 8. | 1. |
| (n) Speed in statute miles per hour. | 7. | 8½. | 12. | 7.5. | 12 (in canal). |
| 14. House: | | | | | |
| (a) Length..... | None. | 11 feet 10 inches | 8 feet 6 inches | 14 feet 6 inches | None. |
| (b) Width..... | | 7 feet. | 6 feet 6 inches | 7 feet 10 inches | |
| (c) Height above deck..... | | 22 inches. | 3 feet 6 inches | 4 feet. | |
| (d) Accommodations. | | 2 men. | 5. | Fixed side seats with cushions. | |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Vernon. | Victoria. | Vigilant. | Violeta. | Viper. |
|--|---|------------------------------|---|---|---|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | \$205.17 | \$1,002.50 | \$1,791.67 | \$1,207.60 | ..... |
| 21. Subsistence..... | 69.69 | 440.80 | 188.00 | (1) | ..... |
| 22. Fuel..... | 67.06 | 640.95 | 183.76 | 921.47 | \$54.25 |
| 23. Supplies (machinery)..... | 13.90 | 39.68 | 72.68 | 139.41 | 9.85 |
| 24. Repair: | | | | | |
| (a) Hull..... | ..... | 18.50 | 124.81 | 120.80 | 27.82 |
| (b) Machinery..... | 29.41 | 42.67 | 31.66 | 200.17 | 75.91 |
| 25. Additions and alterations..... | ..... | 117.50 | 64.72 | ..... | ..... |
| 26. Miscellaneous..... | 2.00 | 3.00 | 19.00 | 160.98 | ..... |
| 27. Total..... | | \$2,305.10 | 2,847..... | 6,899..... | \$167.83 |
| 28. Approximate number of miles run during year..... | 2,818..... | | | | 880. |
| 29. Number of days in commission..... | 145..... | | 359..... | 366..... | 196. |
| 30. Cost of fuel per gallon..... | \$0.22..... | | 9 cents..... | 22.14 cents..... | 16¢, 17¢, and 18¢ cents. |
| | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> |
| | This boat was used on the Choctawhatchee River, Fla., and Ala., between the month and Geneva, Ala., on the Holmes River, Fla., between the month of Vernon, Fla., and from the mouth of Choctawhatchee River, across Choctawhatchee Bay, to Point Washington, Fla., hauling small freight, going for mail, and for making inspections of the river. | Tender for dredge Guadalupe. | Operated at mouth of Columbia River, Oreg. and Wash., and upon Columbia and lower Willamette Rivers below Portland, Oreg.; in connection with examinations, surveys, and dispatch work. | Used by survey party and for light towing on Tampa, Hillsboro, Sarasota, and Boca Ceiga Bays and Manatee River, Fla., and as tender to dredge Barnard. A new 22-horsepower Hercules motor was installed on Apr. 6, 1915, at a cost of \$540 and the old engine in exchange.
Subsistence furnished by United States dredges and survey party of which 1,215 miles was towing. | Used for inspection purposes in Illinois and Mississippi Canal. |

FLOATING PLANT.

4641

| Name..... | W. | Wab-to-Wab. | Watenda. | Wauwander. | Welaka. |
|---|--------------------------------|--|-------------------|----------------------|--|
| 1. District..... | First district, New York City. | First, New York | Kansas City, Mo. | Rock Island, Ill. | Jacksonville, Fla. |
| 2. Where built..... | Amesbury, Mass. | Greenport, N. Y. | Gasconade, Mo. | Tonka Bay, Minn. | Greenport, N. Y. |
| 3. When built..... | 1911. | 1911. | 1914. | 1910. | 1905. |
| 4. Builder..... | Atlantic Dory Co. | Eastern Shipyard Co., at Greenport, N. Y. | United States. | Williams' Boat Yard. | Jas. Reilly Repair & Supply Co. |
| 5. Time to build..... | 6 months. | 8 months 21 days. | 10 days. | 6 months. | Not known. |
| 6. Where purchased..... | New York, N. Y. | Greenport, N. Y. | | St. Louis, Mo. | New York, N. Y. |
| 7. When purchased..... | 1911. | Date of agreement for construction, Apr. 11, 1910. | | 1912. | 1905. |
| 8. From whom purchased..... | Atlantic Dory Co. | Eastern Shipyard Co., of Greenport, N. Y. | | F. Floyd. | Jas. Reilly Repair & Supply Co. |
| 9. Purchase price..... | \$216.50 | \$15,463 minus \$1,500 exchange allowance for steamer "Im- patient." | | \$950. | Part of equipment of dredge St. Johns. |
| 10. Contract cost..... | | \$15,463. | \$296.62. | | Nothing. ¹ |
| 11. Complete cost with outfit..... | \$216.50 | \$15,463. | \$297.78. | \$1,100. | |
| 12. Present value..... | \$108.23 | \$15,301.92. | \$225. | \$612.83. | |
| 13. Hull: | | | | | |
| (a) Material of hull..... | Wood | Wood | Wood | Wood | Wood |
| (b) Length over all..... | 16 feet 4 inches. | 80 feet. | 24 feet. | 30 feet 6 inches. | 20 feet. |
| (c) Length on water line..... | | 73 feet. | 24 feet. | 29 feet 6 inches. | 19 feet 6 inches. |
| (d) Beam over all..... | 4 feet 3 inches. | 15 feet 1 inch. | 5 feet. | 5 feet 9 inches. | 5 feet 6 inches. |
| (e) Beam on water line..... | 3 feet 10 inches. | 13 feet 8 inches. | 4 feet 8 inches. | 5 feet 3 inches. | 4 feet 10 inches. |
| (f) Depth of hull forward..... | | | 2 feet 8 inches. | 3 feet 5 inches. | 2 feet 11 inches. |
| (g) Depth of hull amidships..... | 10 inches. | 6 feet 3 inches. | 2 feet 2 inches. | 3 feet 4 inch. | 2 feet 2 inches. |
| (h) Depth of hull aft..... | | | 1 foot 10 inches. | 2 feet 6 inches. | 2 feet 7 inches. |
| (i) Draft forward..... | 4 inches. | 3 feet 5 inches. | 44 inches. | 1 foot 1 inch. | 1 foot. |
| (j) Draft at..... | 1 foot 2 inches. | 5 feet 3 inches. | 34 inches. | 2 feet. | 1 foot 6 inches. |
| (k) Draft to bottom of propeller..... | 1 foot. | 3 feet. | 1 foot 6 inches. | 1 foot 9 inches. | 1 foot 6 inches. |
| (l) Depth of keel from bottom of out- side of plank- ing..... | | 10 inches forward, 3 feet aft.. | No keel. | 14 inches. | 24 inches. |
| (m) Displacement (long tons)..... | 4 (approximately). | 52. | 1. | 1.5. | 0.5. |
| (n) Speed in statute miles per hour..... | 7. | 15. | 6. | 10 (in canal). | 74. |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | W. | Wth-to-Wth. | Wkends. | Wamandec. | Wkabs. |
|--|--|---|---|---|---|
| 14. House:
(a) Length.....
(b) Width.....
(c) Height above deck..... | None..... | 13 feet.
9 feet.
4 feet. | None..... | None..... | None. |
| (d) Accommodations | | 10 persons seated. | | Canopy top; seats for 6.... | Stern and thwart seats. |
| 15. Motors:
(a) Number.....
(b) Type.....
(c) When built.....
(d) Make.....
(e) Number of cylinders (one engine).....
(f) Diameter of cylinder.....
(g) Stroke.....
(h) Revolutions per minute.....
(i) Rated brake horsepower (total).....
(j) Weight of one motor..... | 1.....
2-cyls.....
Atlantic Dry Co.
1.....
3½ inches.....
3½ inches.....
400.....
3.....
185 pounds..... | 2.....
4-cycle, heavy duty.....
1913.....
Murray & Tregurtha Co.....
4.....
8½ inches.....
11 inches.....
825.....
60 to 80.....
6,000 pounds..... | 1.....
2-cycle, marine.....
1914.....
Detroit Engine Works.....
2.....
4½ inches.....
4½ inches.....
600.....
10.....
350 pounds (plus 77 for reverse gear)..... | 1.....
Asto, 4-cycle.....
1910.....
Capitol.....
4.....
4½ inches.....
5½ inches.....
800.....
20.....
600 pounds..... | 1.....
2-cycle.....
1912.....
J. W. Lathrop.....
1.....
5½ inches.....
5 inches.....
500.....
6.....
325 pounds..... |
| 16. Propeller:
(a) Number of blades.....
(b) Diameter.....
(c) Pitch.....
(d) Diameter of shaft..... | 2.....
12 inches.....
48 inches.....
4 inch..... | 3.....
38 inches.....
46 inches.....
3½ inches..... | 3.....
17 inches.....
22 inches.....
1½ inches..... | 3.....
18 inches.....
20 inches.....
1½ inches..... | 3.....
18 inches.....
Do.....
1 inch..... |
| 17. Heating system:
(a) Type.....
(b) Size of heater.....
(c) Number of radiators..... | None..... | Trilon hot water.....
Sterling No. 13..... | None..... | None..... | None. |
| 18. Electric-light plant:
(a) Make..... | None..... | Dynamo, Hottel Cabot Electric Co., Standard Unit Light & Power Co., Co., New Bedford, Mass. | None..... | None..... | Do. |
| (b) Type of motor.....
(c) Brake horsepower.....
(d) Revolutions per minute..... | | 2-cycle.....
11.....
1,120 F (A-860)..... | | | |

| (c) Capacity of generator in kilowatts. | 10 amperes, 20 volts..... | | | | |
|---|--|---|---|--|---------------|
| (1) Number of lights | 41..... | | | | |
| (b) Average candle-power per light. | 16..... | | | | |
| (b) Diameter of searchlight. | 4..... | | | | |
| 19. Number of men in crew. | 1..... | | | | |
| OPERATING COST. | | | | | |
| 20. Pay roll..... | \$4,648.80 | \$202.33 | | | \$80.00 |
| 21. Subsistence..... | 1,100.40 | 137.69 | | | 30.00 |
| 22. Fuel..... | 1,504.06 | 160.51 | | \$28.76 | 23.04 |
| 23. Supplies (machinery)..... | 143.50 | 62.64 | | 2.10 | |
| 24. Repairs: | | | | | |
| a. Hull..... | 1,554.64 | 20.88 | | 18.10 | |
| b. Machinery..... | 86.81 | 17.97 | | 34.65 | |
| 25. Additions and alterations..... | 6.24 | | | | |
| 26. Miscellaneous..... | 378.59 | 3.10 | | | |
| 27. Total..... | \$8,432.13 | \$695.17 | | \$83.61 | \$143.04 |
| 28. Approximate number of miles run during year..... | 5,625..... | 2,790..... | 328..... | | 596..... |
| 29. Number of days in commission..... | 344..... | 198..... | 197..... | | 150..... |
| 30. Cost of fuel per gallon..... | \$0.23..... | \$0.109..... | 15, 16, 17, and 18 cents..... | | 18 cents..... |
| Remarks. | | Remarks. | | Remarks. | |
| Operated by watchman as ferry between Mill Rock and the mainland. | Operated on Missouri River (Kansas City to month), dispatch service. | Used as inspection boat in Illinois and Mississippi Canal. Formerly T on k a Boy. | Operated as tender to power boat Captain Maguire on the Oklawaha River, Fla., and by survey party on the St. Johns River, Fla., Jacksonville to the ocean, and channel between St. Johns River and Cumberland River and Sound, Ga. and Fla. | The hull and engine have worn out through service and the boat is held for condemnation at Mayport, Fla. | |

TABLE XVII.—Report of operations of gasoline launches (crew) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Whetstone. | Wild Horse. | Wolf. | Zumbro. | No. 1 |
|---|-------------------|-------------------|-------------------|--------------------------|------------------|
| 1. District..... | Kansas City, Mo. | Kansas City, Mo. | Mobile, Ala. | Rock Island, Ill. | Mobile, Ala. |
| 2. Where built..... | Gassonade, Mo. | Gassonade, Mo. | do..... | St. Paul, Minn. | Not known. |
| 3. When built..... | 1915-16. | 1914. | 1907. | 1913. | Do. |
| 4. Builder..... | United States. | United States. | Edward Gorman. | Joseph Dingle. | Do. |
| 5. Time to build..... | 18 days. | 10 days. | 3 months. | 9 months. | Do. |
| 6. Where purchased..... | Do. | Do. | Mobile, Ala. | St. Paul, Minn. | Do. |
| 7. When purchased..... | Do. | Do. | 1907. | 1913. | Do. |
| 8. From whom purchased..... | Do. | Do. | Edward Gorman. | Joseph Dingle. | Do. |
| 9. Purchase price..... | Do. | \$286.62. | \$600. | \$1,724. | Do. |
| 10. Contract cost..... | Do. | \$399.78. | \$600. | \$1,724. | \$250. |
| 11. Complete cost with outfit..... | \$378.08. | | | | |
| 12. Present value..... | \$378. | \$225. | \$5. | \$928.18. | \$225. |
| 13. Hull: | | | | | |
| (a) Material of hull..... | Wood. | Wood. | Wood, pine. | Wood. | Wood. |
| (b) Length over all..... | 24 feet. | 24 feet. | 36 feet 8 inches. | 35 feet. | 17 feet. |
| (c) Length on water line..... | 23 feet 2 inches. | 24 feet. | 33 feet. | 33 feet. | 16 feet. |
| (d) Beam over all..... | 5 feet 6 inches. | 5 feet 2 inches. | 10 feet. | 5 feet 8 inches. | 5 feet 5 inches. |
| (e) Beam on water line..... | 4 feet 6 inches. | 4 feet 8 inches. | 8 feet 3 inches. | 3 feet 10 inches. | 4 feet 5 inches. |
| (f) Depth of hull forward..... | 2 feet 6 inches. | 2 feet 8 inches. | 4 feet 10 inches. | 3 feet 1 inches. | 2 feet 9 inches. |
| (g) Depth of hull amidships..... | 1 foot 10 inches. | 2 feet 2 inches. | 3 feet 6 inches. | 2 feet. | 3 feet 4 inches. |
| (h) Depth of hull aft..... | 2 feet. | 1 foot 10 inches. | 4 feet 6 inches. | 7 1/2 inches. | 2 feet 6 inches. |
| (i) Draft forward..... | 5 inches. | 4 inches. | 1 foot 7 inches. | 14 inches running. | 10 inches. |
| (j) Draft aft..... | do. | 5 inches. | 3 feet 2 inches. | 2 feet 7 inches running. | 1 foot 6 inches. |
| (k) Draft to bottom of propeller..... | 1 foot 8 inches. | 1 foot 6 inches. | 2 feet 8 inches. | 2 feet 1 inch. | 1 foot 5 inches. |
| (l) Depth of keel from bottom of outside of planking..... | No keel. | No keel. | 4 inches. | 1 1/2 inches. | 2 1/2 inches. |
| (m) Displacement (long tons)..... | 1 1/2. | 1. | 18. | 1 1/2. | 2. |
| (n) Speed in statute miles per hour..... | 7. | 6. | 7. | 16. | 7. |
| 14. House: | | | | | |
| (a) Length..... | None. | None. | 21 feet 2 inches. | None. | None. |
| (b) Width..... | None. | None. | 8 feet 2 inches. | None. | None. |
| (c) Height above deck..... | None. | None. | 4 feet. | None. | None. |
| (d) Accommodations..... | None. | None. | None. | Kanyon leather top. | None. |
| | | | | Seats 5 persons. | |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Whitstone. | Wild Horse. | Wolf. | Zembro. | No. 1. |
|--|--|--|---|---|---|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | \$159.15 | 1 944.02 | (*) | \$295.00 | (1) |
| 21. Subsistence..... | 59.00 | 11.75 | ..... | ..... | ..... |
| 22. Fuel..... | 52.67 | 127.30 | ..... | 255.23 | \$11.25 |
| 23. Supplies (machinery)..... | 4.82 | 21.79 | ..... | ..... | 5.00 |
| 24. Repairs: | | | | | |
| (a) Hull..... | ..... | 54.90 | ..... | 95.66 | 7.50 |
| (b) Machinery..... | ..... | 15.82 | ..... | 98.42 | 1.00 |
| 25. Additions and alterations..... | ..... | ..... | ..... | ..... | ..... |
| 26. Miscellaneous..... | 1.94 | ..... | ..... | 10.00 | 10.00 |
| 27. Total..... | \$277.45 | 1,940 | (*) | 4,000 | \$750.31 |
| 28. Approximate number of miles run during year..... | 837 | 1,240 | (*) | 250 | 250 |
| 29. Number of days in commission..... | 134 | 229 | (*) | 138 | 163 |
| 30. Cost of fuel per gallon..... | \$0.183 | \$0.194 | (*) | Gasoline, 18 cents; motor oil, 87 cents. | 22½ cents. |
| | Remarks. | Remarks. | Remarks. | Remarks. | Remarks. |
| | Operated on Missouri River (Kansas City to mouth) dispatch service; handling plant and material rafts. | Operated on Missouri River (Kansas City to mouth) dispatch service; handling plant and material rafts. | 1 All motor equipment has been removed and is in use on the launch Jordan.
2 This launch was not in commission at any time during the year and is lying on reservation at Mobile, Ala. | Inspection and messenger service division, Winona to Wisconsin River. | 1 This boat was operated as a mail and sounding boat on Mobile Bar and when in use was operated by a deck-hand. |

| Name..... | M. R. C. No. 1. | No. 1. | No. 2. | M. R. C. No. 2. | No. 2. |
|---|---|--------------------------|--------------------|---|----------------------------|
| 1. District..... | St. Louis, Mo., Mississippi River Commission. | Wilmington, Del. | Chattanooga, Tenn. | St. Louis, Mo., Mississippi River Commission. | Chattanooga, Tenn. |
| 2. Where built..... | Leavenworth, Ind. | Quincy Point, Mass. | Detroit, Mich. | Leavenworth, Ind. | Knoxville, Tenn. |
| 3. When built..... | 1909 | 1897 | 1897 | 1909 | 1908 |
| 4. Builder..... | D. Lyon Skiff Co. | Baker Yacht Building Co. | Detroit Boat Co. | D. Lyon Skiff Co. | U. S. Engineer Department. |
| 5. Time to build..... | Unknown. | Unknown. | Not known. | Leavenworth, Ind. | 2 months. |
| 6. Where purchased..... | Leavenworth, Ind. | Wilmington, Del. | Detroit, Mich. | 1909 | |
| 7. When purchased..... | 1909 | 1910 | 1897 | D. Lyon Skiff Co. | |
| 8. From whom purchased..... | D. Lyon Skiff Co. | James K. Clarke. | Detroit Boat Co. | \$263.67 | |
| 9. Purchase price..... | \$263.67 | | \$225 | \$263.67 | |
| 10. Contract price..... | \$263.67 | | \$225 | \$263.67 | \$738.35. |
| 11. Complete cost with outfit..... | | | | | \$256. |
| 12. Present value..... | \$160. | \$145. | \$369. | \$155. | Wood. |
| 13. Hull: | Wood. | Wood. | Steel. | Wood. | 22 feet 8 inches. |
| (a) Material of hull..... | 19 feet 6 inches. | 14 feet 2½ inches. | 21 feet 7½ inches. | 19 feet 6 inches. | 22 feet 1½ inches. |
| (b) Length over all..... | 19 feet 6 inches. | 13 feet 10 inches. | 19 feet 1 inch. | 19 feet 6 inches. | |
| (c) Length on water line..... | | | | | |
| (d) Beam over all..... | 4 feet 10 inches. | 4 feet. | 5 feet 7 inches. | 4 feet 10 inches. | 6 feet 5 inches. |
| (e) Beam on water line..... | 4 feet 10 inches. | 2 feet 7 inches. | 4 feet 7½ inches. | 4 feet 10 inches. | 4 feet 8 inches. |
| (f) Depth of hull forward..... | | 23½ inches. | 3 feet 2½ inches. | | 3 feet 8 inches. |
| (g) Depth of hull amidships..... | 1 foot 3 inches. | 2 feet. | 2 feet 9 inches. | 1 foot 3 inches. | 3 feet 2½ inches. |
| (h) Depth of hull aft..... | | 15½ inches. | 3 feet 6 inches. | | 2 feet 2 inches. |
| (i) Draft forward..... | | 8 inches. | 1 foot. | | 1 foot 5 inches. |
| (j) Draft aft..... | | 1 foot 6 inches. | 1 foot 10 inches. | | 2 feet 4 inches. |
| (k) Draft to bottom of propeller..... | | 1 foot 5½ inches. | 1 foot 8 inches. | | 2 feet. |
| (l) Depth of keel from bottom of outside of planking..... | | 2½ inches. | 1 foot 10 inches. | | 2 feet 1 inch. |
| (m) Displacement (long tons). | 0.81. | | 2. | 0.81. | 3. |
| (n) Speed in statute miles per hour. | 6. | 6. | 7. | 6. | 7. |
| 14. House: | | | | | |
| (a) Length..... | | None. | | | |
| (b) Width..... | | | | | |
| (c) Height above deck..... | | | | | |
| (d) Accommodations..... | | | | | |

TABLE XVII.—*Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.*

| Name | M. R. C. No. 1. | No. 1. | No. 2. | M. R. C. No. 2. | No. 3. |
|---|----------------------|-------------------|-------------|----------------------|----------------|
| 15. Motors: | | | | | |
| (a) Number | 1. | 1. | 1. | 1. | 1. |
| (b) Type | 2-cylinder, 4-cycle. | 2-cycle. | 2-cylinder. | 2-cylinder, 4-cycle. | 4-cycle. |
| (c) When built | Not known. | Unknown. | Not known. | Not known. | June, 1908. |
| (d) Make | The Sins-Wallin Co., | Detroit. | Rochester. | The Sins-Wallin Co., | Buffalo No. 5. |
| (e) Number of cylinders (one engine). | 2. | 1. | 2. | 2. | 2. |
| (f) Diameter of cylinder. | 4 inches. | 3 inches. | 4 inches. | 4 inches. | 4 inches. |
| (g) Stroke. | do. | 34 inches. | 44 inches. | do. | 5 inches. |
| (h) Revolutions per minute. | 900. | 400. | 840. | 900. | 800. |
| (i) Rated brake horsepower (total). | 6. | About 2. | 7½. | 6. | 7½. |
| (j) Weight of one motor. | 160 pounds. | About 100 pounds. | 100 pounds. | 160 pounds. | 225 pounds. |
| 16. Propeller: | | | | | |
| (a) Number of blades | 2. | 3. | 2. | 2. | 3. |
| (b) Diameter | 16 inches. | 10 inches. | 16 inches. | 16 inches. | 16 inches. |
| (c) Pitch | do. | 30 inches. | 23 inches. | do. | 23 inches. |
| (d) Diameter of shaft | 1 inch. | 1 inch. | 1 inch. | 1 inch. | 1 inch. |
| 17. Heating system: | | | | | |
| (a) Type | None. | None. | None. | None. | None. |
| (b) Size of heater. | do. | do. | do. | do. | do. |
| (c) Number of radiators. | do. | do. | do. | do. | do. |
| 18. Electric-light plant: | | | | | |
| (a) Make | do. | None. | None. | None. | None. |
| (b) Type of motor. | do. | None. | None. | None. | None. |
| (c) Brake horsepower. | do. | None. | None. | None. | None. |
| (d) Revolutions per minute. | do. | None. | None. | None. | None. |
| (e) Capacity of generator in kilowatts. | do. | None. | None. | None. | None. |
| (f) Number of lights. | do. | None. | None. | None. | None. |
| (g) Average candle-power per light. | do. | None. | None. | None. | None. |
| (h) Diameter of searchlight. | do. | None. | None. | None. | None. |
| 19. Number of men in crew | 1. | No regular crew. | 1. | 1. | 1. |

OPERATING COST.

| | | | | |
|--|--|--|--|--|
| 20. Pay roll..... | \$117.50 | | | \$212.17 |
| 21. Subsistence..... | 33.28 | | | 79.64 |
| 22. Fuel..... | 101.40 | | | 85.00 |
| 23. Supplies (machinery)..... | 13.00 | | | 22.40 |
| 24. Repairs: | | | | |
| (a) Hull..... | | | | |
| (b) Machinery..... | 10.70 | | \$36.70 | 30.50 |
| 25. Additions and alterations..... | | | | |
| 26. Miscellaneous..... | 5.50 | | | |
| 27. Total..... | | \$231.38 | \$36.70 | \$429.71 |
| 28. Approximate number of miles run during year..... | Unknown. | 4,375 | | 2,830. |
| 29. Number of days in commission..... | 366. | 290 | | 131. |
| 30. Cost of fuel per gallon..... | 10 to 24 cents. | 19 cents. | | 19 cents. |
| | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> |
| | Used as mail and sound-
ing boat in connection with
dredging operations, Missis-
sippi River below Cairo.
Altered to motor skiff at
West Memphis, Ark., in
1910. | Used as mail and sound-
ing boat in connection with
dredging Mississippi River
below Cairo.
Altered to motor skiff at
West Memphis, Ark., in
1910. | Used as mail and sound-
ing boat in connection with
dredging Mississippi River
below Cairo.
Altered to motor skiff at
West Memphis, Ark., in
1910. | Sale Creek Shoals, Tennes-
see River. |

TABLE XVII.—*Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.*

| Name..... | No. 3, United States Lake Survey. | No. 4. | No. 4, United States Lake Survey. | M. R. C. No. 4. | No. 5, United States Lake Survey. |
|---|-----------------------------------|--------------------|-----------------------------------|---|-----------------------------------|
| 1. District..... | Detroit, Mich. (lake survey). | Chattanooga, Tenn. | Detroit, Mich. (lake survey). | St. Louis, Mo., Mississippi River Commission. | Detroit, Mich. (lake survey). |
| 2. Where built..... | St. Joseph, Mich. | Knoxville, Tenn. | Detroit, Mich. | Leavenworth, Ind. | Manitowoc, Wis. |
| 3. When built..... | June, 1908. | June, 1908. | 1906. | 1909. | 1909. |
| 4. Builder..... | Truscott Boat Manufacturing Co. | United States | United States Lake Survey. | D. Lyon Skiff Co. | H. B. Beger, Jr. |
| 5. Time to build..... | Unknown. | Not known. | 4 months. | 4 months. | 4 months. |
| 6. Where purchased..... | Built for U. S. Lake Survey. | | | Built for U. S. Lake Survey. | |
| 7. When purchased..... | | | | | |
| 8. From whom purchased..... | | | | | |
| 9. Purchase price..... | \$940. | | | | |
| 10. Contract cost..... | \$940. | \$738.55. | | \$224.50. | Hull, \$737.50; motor, \$324. |
| 11. Complete cost with outfit..... | \$150. | | | \$155. | \$1,425. |
| 12. Present value..... | | | \$800. | | \$700. |
| 13. Hull: | | | | | |
| (a) Material of hull..... | Wood. | Wood. | Wood. | Wood. | Wood. |
| (b) Length over all..... | 22 feet 3 inches. | 22 feet. | 38 feet 6 inches. | 19 feet 6 inches. | 38 feet 1 inch. |
| (c) Length on water line..... | 22 feet 3 inches. | 22 feet. | 34 feet 5 inches. | 19 feet 6 inches. | 36 feet. |
| (d) Beam over all..... | 6 feet 3 inches. | 6 feet 6 inches. | 11 feet. | 4 feet 10 inches. | 9 feet. |
| (e) Beam on water line..... | 6 feet 3 inches. | 5 feet. | 10 feet 6 inches. | 4 feet 10 inches. | 7 feet 5 inches. |
| (f) Depth of hull forward..... | 3 feet 3 inches. | 3 feet 6 inches. | 5 feet 1 inch. | | 5 feet 2 inches. |
| (g) Depth of hull amidships..... | 3 feet 2 inches. | 3 feet 3 inches. | 4 feet 6 inches. | 1 foot 3 inches. | 4 feet. |
| (h) Depth of hull aft..... | 3 feet 2 inches. | 3 feet. | 5 feet 6 inches. | | 4 feet 4 inches. |
| (i) Draft forward..... | 1 foot 2 inches. | 1 foot. | 1 foot 7 inches. | 1 foot 7 inches. | 1 foot 8 inches. |
| (j) Draft aft..... | 2 feet. | 1 foot 6 inches. | 3 feet 7 inches. | 3 feet 7 inches. | 3 feet. |
| (k) Draft to bottom of propeller..... | 2 feet 1 inch. | 2 feet 6 inches. | 3 feet 3 inches. | 3 feet 3 inches. | 2 feet 9 inches. |
| (l) Depth of keel from bottom of outside of planking..... | 2 inches. | 1 foot 4 inches. | 4 inches. | | 4 inches. |
| (m) Displacement (long tons)..... | 2.80. | 6. | 10. | 0.81. | 10. |
| (n) Speed in statute miles per hour..... | 5. | 8. | 7. | 6. | 7½. |

| | | | | |
|---------------------------|---|--------------------|--------------------------|--------------------------------|
| 14. House: | (a) Length..... | None..... | 10 feet 8 inches..... | 9 feet 8 inches..... |
| | (b) Width..... | do..... | 6 feet 1 inch..... | 5 feet 3 inches..... |
| | (c) Height above deck..... | do..... | 5 feet..... | 4 feet 11 inches..... |
| 15. Motors: | (d) Accommodations..... | do..... | 1 berth..... | 1 berth..... |
| | (a) Number..... | 1..... | 1..... | 1..... |
| | (b) Type..... | 4-cycle..... | 4-cycle, heavy duty..... | 4-cycle, heavy duty..... |
| | (c) When built..... | January 1903..... | Not known..... | Unknown..... |
| | (d) Make..... | Buffalo No. 5..... | Buffalo Motor Co..... | Buffalo Gasoline Motor Co..... |
| | (e) Number of cylinders (one engine)..... | 2..... | 4..... | 2..... |
| | (f) Diameter of cylinder..... | 4 inches..... | 5 inches..... | 6 inches..... |
| | (g) Stroke..... | 5 inches..... | 6 1/2 inches..... | 7 1/2 inches..... |
| | (h) Revolutions per minute..... | 500..... | 400..... | 360 normal..... |
| | (i) Rated brake horsepower (total)..... | 7 1/2..... | 20 to 24..... | 12..... |
| | (j) Weight of one motor..... | 225 pounds..... | 1,700 pounds..... | 1,320 pounds..... |
| 16. Propeller: | (a) Number of blades..... | 3..... | 3..... | 3..... |
| | (b) Diameter..... | 16 inches..... | 28 inches..... | 26 inches..... |
| | (c) Pitch..... | 3 inches..... | 32 inches..... | 24 inches..... |
| | (d) Diameter of shaft..... | 1 1/2 inches..... | 1 1/2 inches..... | 1 1/2 inches..... |
| 17. Heating system: | (a) Type..... | None..... | ..... | ..... |
| | (b) Size of heater..... | ..... | ..... | ..... |
| | (c) Number of radiators..... | ..... | ..... | ..... |
| 18. Electric-light plant: | (a) Make..... | None..... | ..... | ..... |
| | (b) Type of motor..... | ..... | ..... | ..... |
| | (c) Brake horsepower..... | ..... | ..... | ..... |
| | (d) Revolutions per minute..... | ..... | ..... | ..... |
| | (e) Capacity of generator in kilowatts..... | ..... | ..... | ..... |
| | (f) Number of lights..... | ..... | ..... | ..... |
| | (g) Average candle-power per light..... | ..... | ..... | ..... |
| | (h) Diameter of searchlight..... | ..... | ..... | ..... |
| | (i) Number of men in crew..... | 2..... | 2 or more..... | 2 or more..... |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | No. 3, United States Lake Survey. | No. 4. | No. 4, United States Lake Survey. | M. R. C. No. 4. | No. 5, United States Lake Survey. |
|--|---|--|---|--|---|
| OPERATING COST. | | | | | |
| 20. Pay roll..... | (1) | \$972.71 | (1) | | (1) |
| 21. Subsistence..... | | 256.04 | | | |
| 22. Fuel..... | \$114.09 | 281.30 | \$256.71 | | \$146.17 |
| 23. Supplies (machinery)..... | 15.30 | 45.90 | 46.48 | | 4.20 |
| 24. Repairs:..... | | | | | |
| (a) Hull..... | | 181.72 | 8.45 | | 27.92 |
| (b) Machinery..... | 8.30 | 11.00 | 178.11 | | 62.68 |
| 25. Additions and alterations..... | | | | | |
| 26. Miscellaneous..... | 13.77 | | 48.98 | | 36.97 |
| 27. Total..... | \$151.46 | \$1,748.70 | \$538.73 | | \$277.94 |
| 28. Approximate number of miles run during year..... | | 2,555 | | | |
| 29. Number of days in commission..... | 204 | 252 | 205 | | 202 |
| 30. Cost of fuel per gallon..... | 21 cents. | 20 cents. | 19 cents. | | 18.9 cents. |
| | Remarks. | Remarks. | Remarks. | Remarks. | Remarks. |
| | On hydrographic work with steamer Col. J. L. Lusk. Included with steamer Col. J. L. Lusk. | Williams and Lyons Shouls, Tenn., River. | On hydrographic work with steamer Surveyor. Included with steamer Surveyor. | Used as mail and sounding boat in connection with dredging Mississippi River below Cairo. Altered to motor skiff at West Memphis, Ark., in 1910. | On hydrographic work with steamer Search. Included with steamer Search. |

| Name..... | No. 6. | No. 6, United States Lake Survey. | No. 7. | No. 8. |
|--|--------------------------------------|--------------------------------------|----------------------------|--------------------|
| 1. District..... | Chattanooga, Tenn. | Detroit, Mich. (lake survey). | Chattanooga, Tenn. | Chattanooga, Tenn. |
| 2. Where built..... | Muscle Shoals Canal, Ala. | Manitowoc, Wis. | Muscle Shoals Canal, Ala. | Riverton, Ala. |
| 3. When built..... | 1909. | 1909. | 1904; hull rebuilt 1916. | 1913. |
| 4. Builder..... | United States Engineer Department. | H. B. Berger, Jr. | United States | Wm. A. Sloan. |
| 5. Time to build..... | 14 months. | 4 months. | 60 days. | |
| 6. Where purchased..... | Built for United States Lake Survey. | Built for United States Lake Survey. | | Riverton, Ala. |
| 7. When purchased..... | | | | Feb. 14, 1914. |
| 8. From whom purchased..... | | | | Wm. A. Sloan. |
| 9. Purchase price..... | | Hull, \$737.50; motor, \$524. | | \$200. |
| 10. Contract cost..... | \$533.76. | \$1,425. | \$965.57. | \$200. |
| 11. Complete cost with outfit..... | \$44. | \$700. | \$503. | \$503. |
| 12. Present value..... | | | | |
| 13. Hull: | Wood. | Wood. | Wood. | Wood. |
| (a) Material of hull..... | 28 feet 4 inches. | 36 feet. | 22 feet. | 23 feet 9 inches. |
| (b) Length over all..... | 28 feet. | 30 feet. | 22 feet. | 22 feet 8 inches. |
| (c) Length on water line..... | 5 feet. | 9 feet. | 5 feet. | 4 feet 10 inches. |
| (d) Beam over all..... | 5 feet. | 7 feet 5 inches. | 4 feet 10 inches. | 4 feet 10 inches. |
| (e) Depth of hull forward..... | 2 feet 10 inches. | 2 feet 2 inches. | 3 feet 10 inches. | 3 feet 10 inches. |
| (f) Depth of hull amidships..... | 2 feet 6 inches. | 4 feet. | 2 feet 9 inches. | 3 feet 7 inches. |
| (g) Depth of hull aft..... | 1 foot 8 inches. | 4 feet 4 inches. | 1 foot 10 1/2 inches. | 2 feet 5 inches. |
| (h) Draft forward..... | 10 1/2 inches. | 1 foot 8 inches. | 1 foot 2 inches. | 1 foot 11 inches. |
| (i) Draft aft..... | 2 inches. | 3 feet. | 4 inches. | 2 feet. |
| (j) Draft to bottom of propeller..... | 2 feet. | 2 feet 9 inches. | 1 foot 10 inches. | 2 feet 5 inches. |
| (k) Depth of keel from bottom of planking..... | 4 inch. | 4 inches. | 1 1/2 inches. | 1 inch. |
| (l) Displacement (long tons)..... | 4. | 10. | 14. | 1.92. |
| (m) Displacement (long tons)..... | 4. | 10. | 14. | 1.92. |
| (n) Speed in statute miles per hour..... | 8. | 7-8. | 10. | 15. |
| 14. House: | | | | |
| (a) Length..... | 9 feet 10 inches. | 9 feet 10 inches. | None. | |
| (b) Width..... | 5 feet 3 inches. | 5 feet 3 inches. | do. | |
| (c) Height above deck..... | 4 feet 11 inches. | 4 feet 11 inches. | do. | |
| (d) Accommodations..... | 1 berth. | 1 berth. | do. | |
| 15. Motors: | | | | |
| (a) Number..... | 1. | 1. | 1. | 1. |
| (b) Type..... | Marine. | 4-cycle, heavy duty. | 4-cylinders. | Automobile. |
| (c) When built..... | June, 1919. | Unknown. | October, 1908. | |
| (d) Make..... | Buffalo. | Buffalo Gasoline Motor Co. | Buffalo Gasoline Motor Co. | Reliance Motor Co. |
| (e) Number of cylinders (1 engine)..... | 4. | 2. | 4. | 3. |
| (f) Diameter of cylinder..... | 3 inches. | 6 inches. | 3 inches. | 6 inches. |
| (g) Stroke..... | 4 inches. | 7 1/2 inches. | 4 inches. | 44 inches. |
| (h) Revolutions per minute..... | 460. | 350 normal. | 600. | 1,200. |
| (i) Rated brake horsepower (total)..... | 10. | 12. | 10. | 18. |
| (j) Weight of one motor..... | 700 pounds. | 1,320 pounds. | 460 pounds. | 614 pounds. |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | No. 6. | No. 6, United States Lake Survey. | No. 7. | No. 8. |
|--|---|---|---|-----------------------|
| 16. Propeller: | | | | |
| (a) Number of blades..... | 3. | 3. | 3. | 3. |
| (b) Diameter..... | 18 inches. | 20 inches. | 18 inches. | 16 inches. |
| (c) Pitch..... | 22 inches. | 24 inches. | 24 inches. | 34 inches. |
| (d) Diameter of shaft..... | 1½ inches. | 1½ inches. | 1½ inches. | 1 inch. |
| 17. Heating system: | | | | |
| (a) Type..... | do. | do. | do. | do. |
| (b) Size of heater..... | do. | do. | do. | do. |
| (c) Number of radiators..... | do. | do. | do. | do. |
| 18. Electric-light plant: | | | | |
| (a) Make..... | do. | do. | do. | do. |
| (b) Type of motor..... | do. | do. | do. | do. |
| (c) Brake horsepower..... | do. | do. | do. | do. |
| (d) Revolutions per minute..... | do. | do. | do. | do. |
| (e) Capacity of generator in kilowatts..... | do. | do. | do. | do. |
| (f) Number of lights..... | do. | do. | do. | do. |
| (g) Average candlepower per light..... | do. | do. | do. | do. |
| (h) Diameter of searchlight..... | do. | do. | do. | do. |
| 19. Number of men in crew..... | 1. | 2 or more. | 1. | 1. |
| 20. Pay roll..... | | | | |
| 21. Subsistence..... | | (1) | | |
| 22. Fuel..... | \$271.10 | \$158.50 | \$125.97 | \$95.00 |
| 23. Supplies (machinery)..... | 91.66 | 15.30 | 33.06 | 33.06 |
| 24. Repairs: | | | | |
| (a) Hull..... | | 20.76 | 19.50 | 21.79 |
| (b) Machinery..... | 67.00 | 76.04 | 1241.44 | 3.28 |
| 25. Additions and alterations..... | | 37.64 | 1320.23 | 30.96 |
| 26. Miscellaneous..... | | 37.22 | 3.00 | |
| Total..... | \$429.76 | \$375.55 | \$842.44 | \$150.02 |
| 27. Approximate number of miles run during year..... | 4,802 | | 1,793 | 222 |
| 28. Number of days in commission..... | 268 | 244 | 58 | 161 |
| 29. Cost of fuel per gallon..... | 24 cents. | 20.3 cents. | 21.7 cents. | 24½ cents. |
| Remarks..... | Big Bend Shoals, Bear Creek Shoals, Indian Creek Shoals, and Riverton look approach, Tennessee River. | On hydrographic work with steamer (Col. J. L. Lusk. Included with steamer (Col. J. L. Lusk. | Kopers Island and Tumbula Bar, Tennessee River. New hull built and materials included in these costs. | Colbert Shoals Canal. |

| Name. | No. 5, U. S. L. S. | No. 53, U. S. E. D. Wheeling. | No. 54, U. S. E. D. Wheeling. | No. 56, U. S. E. D. Wheeling. |
|---|------------------------------|-------------------------------|-------------------------------|-------------------------------|
| 1. District..... | Detroit, Mich. (Lake Survey) | Wheeling, W. Va. | Wheeling, W. Va. | Wheeling, W. Va. |
| 2. Where built..... | Detroit, Mich. | Pittsburgh, Pa. | Pittsburgh, Pa. | Pittsburgh, Pa. |
| 3. When built..... | February-April, 1913 | 1914..... | 1914..... | 1914..... |
| 4. Builder..... | United States Lake Survey | R. C. Price & Co. (hull only) | R. C. Price & Co. | R. C. Price & Co. |
| 5. Time to build..... | 3 months | Pittsburgh, Pa. | Pittsburgh, Pa. | Pittsburgh, Pa. |
| 6. Where purchased..... | | 1914..... | 1914..... | 1914..... |
| 7. When purchased..... | | R. C. Price & Co. | R. C. Price & Co. | R. C. Price & Co. |
| 8. From whom purchased..... | | \$90..... | \$90..... | \$90..... |
| 9. Purchase price..... | | \$331.87 | \$355..... | \$408.16 |
| 10. Contract cost..... | | \$300..... | \$200..... | \$175..... |
| 11. Complete cost with outfit..... | | | | |
| 12. Present value..... | | | | |
| 13. Hull: | | | | |
| (a) Material of hull..... | Wood | Wood | Wood | Wood |
| (b) Length over all..... | 23 feet 3 inches | 23 feet | 23 feet | 23 feet |
| (c) Length on water line..... | 23 feet | do. | 21 feet 4 inches | 21 feet 6 inches |
| (d) Beam over all..... | 6 feet 6 inches | 5 feet 10 inches | 5 feet 10 inches | 5 feet 5 inches |
| (e) Beam on water line..... | 5 feet 7 inches | 4 feet 5 inches | 4 feet 5 inches | 4 feet 5 inches |
| (f) Depth of hull forward..... | 4 feet 5 inches | 2 feet 7 inches | 2 feet 7 inches | 2 feet 7 inches |
| (g) Depth of hull amidships..... | 3 feet 3 inches | 1 foot 10 inches | 1 foot 10 inches | 1 foot 10 inches |
| (h) Depth of hull aft..... | 3 feet 7 inches | do. | do. | do. |
| (i) Draft forward..... | 11 inches | 24 inches | 24 inches | 24 inches |
| (j) Draft aft..... | 2 feet | 3 inches | 3 inches | 3 inches |
| (k) Draft to bottom of propeller..... | 1 foot 9 inches | 1 foot 8 inches | 1 foot 8 inches | 1 foot 8 inches |
| (l) Depth of keel from bottom of outside of planking..... | 2 inches | 1.5..... | 1.5..... | 1.9..... |
| (m) Displacement (long tons)..... | 2.4..... | 8..... | 8..... | 8..... |
| (n) Speed in statute miles per hour..... | | | | |
| 14. House: | | | | |
| (a) Length..... | | None..... | None..... | None..... |
| (b) Width..... | | | | |
| (c) Height above deck..... | | | | |
| (d) Accommodations..... | | | | |
| 15. Motors: | | | | |
| (a) Number..... | 1..... | 1..... | 1..... | 1..... |
| (b) Type..... | Regular, 4-cycle. | 2-cycle. | 2-cycle, 2-cylinder | 2-cycle. |
| (c) When built..... | 1913..... | 1914..... | 1910..... | 1914..... |
| (d) Make..... | Buffalo Gasoline Motor Co. | Perry Machine & Foundry Co. | Perry Machine & Foundry Co. | Perry Machine & Foundry Co. |
| (e) Number of cylinders (one engine)..... | 2..... | 2..... | 2..... | 2..... |
| (f) Diameter of cylinder..... | 4 1/2 inches | 3 1/2 inches | 3 1/2 inches | 3 1/2 inches |
| (g) Stroke..... | 5 inches | 3 1/2 inches | 3 1/2 inches | 3 1/2 inches |
| (h) Revolutions per minute..... | 600..... | 600 to 800..... | 600 to 800..... | 600 to 800..... |
| (i) Rated brake horsepower (total)..... | 8-9..... | 8..... | 8..... | 8..... |
| (j) Weight of one motor..... | 575 pounds | 350 pounds | 350 pounds | 350 pounds |
| 16. Propeller: | | | | |
| (a) Number of blades..... | 3..... | 3..... | 3..... | 3..... |
| (b) Diameter..... | 16 inches | 16 inches | 16 inches | 16 inches |
| (c) Pitch..... | do. | 23 1/2 inches | 17 1/2 inches | 23 1/2 inches |
| (d) Diameter of shaft..... | 1 inch | 1 inch | 1 inch | 1 inch |

TABLE XVII.—Report of operations of gasoline launches (screw) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | No. 8, U. S. L. S. | No. 83, U. S. E. D. ⁸ Wheeling. | No. 34, U. S. E. D. Wheeling. | No. 36, U. S. E. D. Wheeling. |
|--|---|---|--|---|
| 17. Heating system: | | | | |
| (a) Type..... | | None. | None. | None. |
| (b) Size of heater..... | | | | |
| (c) Number of radiators..... | | | | |
| 18. Electric-light plant: | | | | |
| (a) Make..... | | None. | None. | None. |
| (b) Type of motor..... | | | | |
| (c) Brake horsepower..... | | | | |
| (d) Revolutions per minute..... | | | | |
| (e) Capacity of generator in kilowatts..... | | | | |
| (f) Number of lights..... | | | | |
| (g) Average candlepower per light..... | | | | |
| (h) Diameter of searchlight..... | | | | |
| 19. Number of men in crew..... | 1 or more. | 1. | | 1. |
| OPERATING COST. | | | | |
| 20. Pay roll..... | (1) | \$119.64 | | |
| 21. Subsistence..... | | | | |
| 22. Fuel..... | \$64.65 | | \$10.40 | \$43.20 |
| 23. Supplies (machinery)..... | 4.20 | 3.46 | 7.80 | |
| 24. Repairs..... | | | | |
| (a) Hull..... | 12.13 | | | |
| (b) Machinery..... | 32.40 | 44.70 | | 1.07 |
| 25. Additions and alterations..... | | | | |
| 26. Miscellaneous..... | 14.34 | | | |
| 27. Total..... | \$157.72 | \$203.00 | \$18.20 | \$44.27 |
| 28. Approximate number of miles run during year..... | 189 | 600 | 250 | 600 |
| 29. Number of days in commission..... | 19 cents | 157 | 5 (estimated). | 240 |
| 30. Cost of fuel per gallon..... | | 21 to 23 cents. | 24 cents. | 21 cents (average). |
| | Remarks | Remarks | Remarks | Remarks |
| | On hydrographic work with steamer Search. 1 included with steamer Search. | Between Dam No. 22, Ohio River and Huntington, W. Va., as tender with drill party, from June 1 to Sept. 26. As ferry between West Virginia river bank and pass conderdam at Dam No. 22, Ohio River, during November and December. 1 Engine and fittings installed by the United States at Dam No. 11, Ohio River. | Used for light towing and delivering supplies at Dam No. 11, Ohio River, operated by lock employees. | In Ohio River at Dam No. 16 and vicinity in connection with construction of the lock and dam. |

TABLE XVIII.

GASOLINE LAUNCHES (PADDLE).

4657

TABLE XVIII.—Report of operations of gasoline launches (paddle) for the calendar year ending Dec. 31, 1916.

| 1. Name..... | Comet. | Coosa. | Gasconade. | Glenville. | Katie Fells. |
|--|--|---|--|--|--|
| 2. District..... | First, Cincinnati, Ohio..... | Montgomery, Ala..... | Kansas City, Mo..... | Wheeling, W. Va..... | Seattle, Wash..... |
| 3. Where built..... | Lock 3, Coosa River, Ala..... | Lock 3, Coosa River, Ala..... | Gasconade, Mo..... | Grafton, Ill..... | Bremerton, Wash..... |
| 4. When built..... | 1910-11..... | 1910-11..... | 1910..... | 1912..... | 1913-14..... |
| 5. Builder..... | U. S. Engineer Department..... | U. S. Engineer Department..... | U. S. Engineer Department..... | Ripley Hardware Co..... | U. S. Navy Department..... |
| 6. Time to build..... | 3 months..... | 3 months..... | 2 months..... | 3 months..... | 7 months..... |
| 7. Where purchased..... | Hanging Rock, Ohio..... | ..... | ..... | ..... | ..... |
| 8. When purchased..... | 1912..... | ..... | ..... | ..... | ..... |
| 9. From whom purchased..... | Samuel Elcher..... | ..... | ..... | ..... | ..... |
| 10. Purchase price..... | \$2,000..... | ..... | \$2,675..... | \$2,500..... | \$3,946.85..... |
| 11. Contract cost..... | \$2,000..... | \$10,674.76..... | \$3,500..... | \$2,679.15..... | \$9,100..... |
| 12. Complete cost with outfit..... | \$300..... | \$9,000..... | \$1,500..... | \$1,300..... | \$6,800..... |
| 13. Present value..... | Rounded bow..... | Scow..... | Rounded bow..... | Rounded bow..... | Rounded bow..... |
| 14. Hull:
(a) Type of hull (scow or rounded bow).
(b) Material of hull.....
(c) Length over all.....
(d) Beam over all.....
(e) Beam on water line.....
(f) Depth of hull amidship.....
(g) Draft forward.....
(h) Draft aft.....
(i) Draft to bottom of paddle wheel.....
(j) Displacement (long tons).
(k) Speed in statute miles per hour. | Wood.....
66 feet.....
16 feet.....
12 feet.....
3 feet 4 inches.....
9 inches.....
1 foot 3½ inches.....
1 foot 2 inches.....
21.....
8..... | Wood.....
95 feet.....
18 feet 6 inches.....
18 feet.....
4 feet 9 inches.....
2 feet 4 inches.....
2 feet 4 inches.....
1 foot 4 inches.....
123.....
12..... | Wood.....
59 feet 2 inches.....
12 feet 6 inches.....
11 feet 8 inches.....
2 feet 6 inches.....
1 foot ½ inch.....
1 foot 2½ inches.....
11 inches.....
13.....
6..... | Steel.....
53 feet 6 inches.....
12 feet.....
9 feet.....
3 feet.....
8 inches.....
12 inches.....
do.....
10.....
6..... | Wood.....
60 feet 6½ inches.....
11 feet 5½ inches.....
11 feet 5½ inches.....
8 feet 7 inches.....
1 foot 3 inches.....
1 foot 3 inches.....
9 inches.....
18.....
8½..... |
| 15. House:
(a) Length.....
(b) Width.....
(c) Height above deck.....
(d) Accommodations. | 51 feet.....
12 feet.....
5 feet.....
Cabin, 10 feet 6 inches by 11 feet 4 inches. | 61 feet.....
11½ feet.....
15 feet 10 inches.....
6 persons..... | 41 feet 2½ inches.....
10 feet 7 inches forward; 8 feet 10 inches aft.....
7 feet.....
None..... | 37 feet 9 inches.....
9 feet.....
6 feet 9 inches.....
None..... | 14 feet.....
7 feet 3 inches.....
6 feet 5 inches and 9 feet 5 inches.....
None..... |

16. Motors:

| (a) Number.
(b) Type.
(c) Make.
(d) When built.
(e) Number of cylinders.
(f) Diameter of cylinders.
(g) Stroke.
(h) Revolutions per minute.
(i) Rated brake horsepower (total).
(j) Weight of motor. | 1.
Naphtha-gasoline.
Fairbanks-Morse. | 2.
4-cycle, make and break.
Otto Gas Engine & Power Co.
Not known. | 1.
4-cycle Lamb.
Lamb Boat & Engine Co. | 1.
4-cycle, 4-cylinder marine.
Clifton Motor Works. | 1.
4-cycle.
Corliss. |
|---|---|---|---|---|-------------------------------|
| | | | | | |
| (a) Number. | 1. | 2. | 1. | 1. | 1. |
| (b) Type. | Naphtha-gasoline. | 4-cycle, make and break. | 4-cycle Lamb. | 4-cycle, 4-cylinder marine. | 4-cycle. |
| (c) Make. | Fairbanks-Morse. | Otto Gas Engine & Power Co. | Lamb Boat & Engine Co. | Clifton Motor Works. | Corliss. |
| (d) When built. | 1913. | Not known. | No record. | 1913. | 1913. |
| (e) Number of cylinders. | 6. | 2. | 4. | 4. | 6. |
| (f) Diameter of cylinders. | 11½ inches. | 11 inches. | 6½ inches. | 6½ inches. | 6½ inches. |
| (g) Stroke. | 18 inches. | 22 inches. | 7 inches. | 7 inches. | 7½ inches. |
| (h) Revolutions per minute. | 200. | 250. | 450. | 400. | 450. |
| (i) Rated brake horsepower (total). | 32. | 80. | 40. | 28. | 65. |
| (j) Weight of motor. | 10,900 pounds. | | 2,150 pounds. | 1,800 pounds. | 5,800 pounds. |
| 17. Paddle wheel: | | | | | |
| (a) Diameter. | 8 feet. | 12 feet 10 inches. | 8 feet 8 inches. | 9 feet 6 inches. | 8 feet 3 inches. |
| (b) Number of buckets. | 11. | 13. | 11. | 12. | 10. |
| (c) Length and width of buckets. | 9 feet 5 inches by 14 inches. | 12 feet by 16 inches. | 4 feet 6 inches single, 10 feet total; 12 inches. | 7 feet 2 inches by 11 inches. | 8 feet 6 inches by 2½ inches. |
| (d) Diameter of shaft. | 3½ inches hexagonal. | 3½ inches. | 3 inches. | 2½ inches. | 4½ inches. |
| (e) Revolutions per minute. | 28. | 24. | 35. | 40. | 44. |
| 18. Number of men in crew. | Operated by lock force. | 6 single shift; 10 double shift. | 3. | 2. | |
| OPERATING COST. | | | | | |
| 19. Pay roll. | (1) | \$3,685.96 | \$152.89 | | (1) |
| 20. Subistence. | (1) | 1,080.47 | 68.85 | | (1) |
| 21. Fuel. | | 1,314.04 | 220.76 | \$358.38 | (1) |
| 22. Supplies (machinery). | | 41.32 | 30.60 | 14.00 | (1) |
| 23. Repairs: | | | | | |
| (a) Hull. | | | 120.06 | 185.21 | |
| (b) Machinery. | | | 10.00 | 7.25 | |
| 24. Additions and alterations. | | | | | |
| 25. Miscellaneous. | 16.90 | 680.61 | 23.78 | 32.00 | (1) |
| Total. | \$279.56 | \$6,381.39 | \$917. | \$596.94 | (1) |
| 26. Approximate number of miles run during year. | | 2,791. | 917. | 1,787. | 75. |

TABLE XVIII.—Report of operations of gasoline launches (paddle) for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name | Comd. | Coosa. | Gasconade. | Glenville. | Katie Falls. |
|------------------------------|--|--|--|---|--|
| OPERATING COST—contd. | | | | | |
| 28. Days in commission. | 146..... | 286..... | 87..... | 57..... | 10..... |
| 32. Cost of fuel per gallon. | \$0.2087..... | \$0.2259..... | 18 cents..... | 19 to 24 cents..... | (1). |
| | <p><i>Remarks.</i></p> <p>Operated at Dam 37, Ohio River, except 1 trip to Dam 29, 2 trips to Dam 36, and 19 days used as tender to dredge Indiana.</p> <p>1 Operated by lock force except from Sept. 16 to Oct. 5, 1916, used as tender for dredge Indiana; pay roll, \$38.</p> | <p><i>Remarks.</i></p> <p>This boat has been operated throughout the year between Riverside, Ala., and Dam No. 5, Coosa River, Ala., with the exception of 1 trip to Gadsden, Ala., and return. She has been engaged in the towing of materials for use in construction of the dam and cofferdam at Dam No. 5.</p> | <p><i>Remarks.</i></p> <p>Operated on the Missouri and Gasconade Rivers, principally on the Gasconade River as a tender at Gasconade boat yard.</p> <p>1 Split wheel, center drive, gear transmission.</p> | <p><i>Remarks.</i></p> <p>Operated on Ohio and Little Kanawha Rivers, for delivering boats and supplies.</p> <p>No regular crew; operated when in commission by lock employees.</p> | <p><i>Remarks.</i></p> <p>Operated at Box Canyon, Columbia River, moving drill scow.</p> <p>1 Norecord was kept, as boat was operated during only a portion of each of 10 days; manned by employees from drill scow, and all supplies furnished by drill scow.</p> |

TABLE XVIII.—Report of operations of gasoline launches (paddle) for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name..... | Katherine. | Leon. | Niota. | Richland. |
|---|-----------------------------------|--|--------------------------------|--|
| 2. District..... | Kansas City, Mo..... | Rock Island, Ill..... | Chattanooga, Tenn..... | Charleston, S. C..... |
| 3. Where built..... | Gasconade, Mo..... | Blossom, Ill..... | Knockville, Tenn..... | United States Locket, Conga-
ree River, S. C. |
| 4. When built..... | 1912..... | 1907..... | 1911..... | 1912-13..... |
| 5. Builder..... | U. S. Engineer Department..... | Sherrard Bros..... | U. S. Engineer Department..... | U. S. Engineer Department..... |
| 6. Time to build..... | 1 year; construction delayed..... | Not known..... | 3 months..... | 11 months..... |
| 7. Where purchased..... | | Rock Island, Ill..... | | |
| 8. When purchased..... | | September, 1910..... | | |
| 9. From whom purchased..... | | Sherrard Bros..... | | |
| 10. Purchase price..... | \$1,000..... | \$1,000..... | | |
| 11. Contract cost..... | \$8,363.44..... | \$1,000..... | \$3,255..... | \$10,277.26..... |
| 12. Complete cost with outfit..... | \$9,912.37..... | \$1,125.74..... | (1)..... | \$8,500..... |
| 13. Present value..... | \$6,750..... | | | |
| 14. Hull: | | | | |
| (a) Type of hull (scow or rounded bow)..... | Rounded bow..... | Rounded bow..... | Scow..... | Scow..... |
| (b) Material of hull..... | Wood..... | Wood..... | Wood..... | Wood..... |
| (c) Length over all..... | 86 feet 4 inches..... | 46 feet..... | 81 feet 8 inches..... | 103.6 feet..... |
| (d) Beam over all..... | 22 feet..... | 13 feet..... | 17 feet..... | 20 feet 6 inches..... |
| (e) Beam on water line..... | 20 feet..... | 10 feet..... | 12 feet 10 inches..... | 20 feet..... |
| (f) Depth of hull amidship..... | 3 feet..... | 3 feet..... | 3 feet 1 inch..... | 4 feet 7 inches..... |
| (g) Draft forward..... | 1 foot 3 inches..... | 1 foot 6 inches..... | 1 foot 1 inch..... | 1 foot 6 inches..... |
| (h) Draft aft..... | 1 foot 6 inches..... | 1 foot 6 inches..... | 1 foot 4 inches..... | 2 feet 3 inches..... |
| (i) Draft to bottom of paddle wheel..... | 1 foot 3 inches..... | 14 inches..... | 1 foot 3 inches..... | 1 foot 2 inches..... |
| (j) Displacement (long tons)..... | 50 (approximate)..... | 10..... | 25..... | 78.7..... |
| (k) Speed in statute miles per hour..... | 6..... | 6..... | 8..... | 7..... |
| 15. House: | | | | |
| (a) Length..... | 61 feet..... | 30 feet..... | 60 feet 8 inches..... | (1)..... |
| (b) Width..... | 12 feet..... | 12 feet..... | 14 feet..... | (1)..... |
| (c) Height above deck..... | 7 feet 3 inches..... | 7 feet..... | 6 feet 6 inches..... | (1)..... |
| (d) Accommodations..... | 17..... | Seating capacity, 20..... | | (1)..... |
| 16. Motors: | | | | |
| (a) Number..... | 1..... | 1..... | 1..... | 1..... |
| (b) Type..... | Gasoline; Lamb marine..... | No. 94 gasoline..... | horizontal gasoline..... | 4-cycle, make-and-break..... |
| (c) Make..... | Lamb..... | Lamb, Root & Engine Co.,
Clinton, Iowa..... | Lambert..... | Otto Gas Engine Works,
Philadelphia, Pa..... |
| (d) When built..... | 1911..... | 1907..... | | 1912..... |
| (e) Number of cylinders (one engine)..... | 6..... | 3..... | 1..... | 2..... |
| (f) Diameter of cylinders..... | 64 inches..... | 64 inches..... | 11 inches..... | 11 inches..... |
| (g) Stroke..... | 7 inches..... | 7 inches..... | 18 inches..... | 19 inches..... |
| (h) Revolutions per minute..... | 450..... | 450..... | 240..... | 283 to 240..... |
| (i) Rated brake horsepower (total)..... | 60..... | 30..... | 30..... | 40 horsepower per cylinder..... |
| (j) Weight of one motor..... | 2,900 pounds..... | 2,000 pounds..... | 6,500 pounds..... | 16,600 pounds (complete)..... |

TABLE XVIII.—Report of operations of gasoline launches (paddle) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Katherine. | Lena. | Niota. | Richland. |
|---|---------------------------|--------------------------------------|-----------------------------------|---|
| 17. Paddle wheel: | | | | |
| (a) Diameter..... | 9 feet 6 inches..... | 7 feet..... | 8 feet 3 inches..... | 12 feet..... |
| (b) Number of buckets..... | 10..... | 12..... | 10..... | 13..... |
| (c) Length and width of buckets..... | 13 feet by 15 inches..... | 6 feet by 12 inches..... | 9 feet 8 inches by 12 inches..... | 14 feet by 13 inches..... |
| (d) Diameter of shaft..... | 4 inches..... | 24 inches..... | 34 inches..... | 4½ inches..... |
| (e) Revolutions per minute..... | 30..... | 25..... | 4..... | 21..... |
| 18. Number of men in crew..... | 6..... | 2..... | 4..... | 4..... |
| OPERATING COST. | | | | |
| 19. Pay roll..... | \$1,025.00 | \$633.33 | \$781.83 | \$2,504.75 |
| 20. Subsistence..... | 355.10 | 224.00 | 150.88 | 711.54 |
| 21. Fuel..... | 196.57 | 303.45 | 340.66 | 988.94 |
| 22. Supplies (machinery)..... | 12.55 | 20.03 | 30.51 | 124.63 |
| 23. Repairs: | | | | |
| (a) Hull..... | 194.57 | 91.61 | 5.01 | 83.52 |
| (b) Machinery..... | 867.56 | 200.63 | 78.21 | 151.78 |
| 24. Additions and alterations..... | 65.00 | 8.90 | | 250.95 |
| 25. Miscellaneous..... | 129.66 | | | |
| Total..... | \$2,781.01 | \$1,546.85 | \$1,387.10 | \$4,946.00 |
| 26. Approximate number of miles run during year..... | 696..... | 1,447..... | 1,100..... | 2,1294. |
| 28. Days in commission..... | 183..... | 264..... | 104..... | 326. |
| 29. Cost of fuel per gallon..... | 18 cents. | \$0.2463. | 21 cents. | Gasoline 24 cents and kerosene 1½ cents per gallon. |
| Remarks. | | | | |
| Operated Kansas City, Mo., to mouth, as required in survey work. Engineer and steersman assisted by survey party when running the boat.
! Staggered. | | Operated on upper Mississippi River. | | Operated on Santee and Congaree Rivers, S. C. The tender did all necessary towing for Santee and Congaree Rivers and kept the dredge and snag boat supplied with fuel, etc.
! Lower, forward, 23 feet 4 inches; aft, 22 feet; middle (open sides), 27 feet 10 inches; upper pilot, 20 feet 3 inches; cabins, 50 feet 5 inches. |

L. wer, forward, 13 feet;
 aft, 18 feet; middle, 18 feet;
 upper pilot, 10 feet; cabins, 11 feet.
 * Lower, forward, 9 feet;
 aft, 9 feet; middle, 9 feet;
 upper pilot, 9 feet; 6 inches;
 cabins, 7 feet 4 inches.
 * Two cabins and room for
 steward; kitchen, storeroom,
 and bathroom, with closet.

TABLE XVIII.—Report of operations of gasoline launches (paddle) for the calendar year ending Dec. 31, 1916—Continued.

| Name..... | Katherine. | Leona. | Nota. | Richland. |
|---|--|---|--|---|
| 17. Paddle wheel:
(a) Diameter.....
(b) Number of buckets.....
(c) Length and width of buckets.....
(d) Diameter of shaft.....
(e) Revolutions per minute.....
18. Number of men in crew..... | 9 feet 6 inches.....
10.....
13 feet by 15 inches ¹
4 inches.....
30.....
2.....
5..... | 7 feet.....
13.....
6 feet by 12 inches.....
24 inches.....
23.....
2..... | 8 feet 3 inches.....
10.....
9 feet 8 inches by 12 inches.....
34 inches.....
4..... | 12 feet.....
13.....
14 feet by 12 inches.....
44 inches.....
21.....
4..... |
| OPERATING COST. | | | | |
| 19. Pay roll..... | \$1,025.00 | \$933.33 | \$781.83 | \$2,504.75 |
| 20. Subsistence..... | 353.10 | 234.00 | 130.88 | 711.54 |
| 21. Fuel..... | 193.97 | 303.46 | 840.66 | 938.94 |
| 22. Supplies (machinery)..... | 12.56 | 20.08 | 30.51 | 124.62 |
| 23. Repairs:
(a) Hull.....
(b) Machinery..... | 194.57
867.56 | 91.81
200.33 | 5.01
78.21 | 82.52
151.78 |
| 24. Additions and alterations..... | ..... | 8.80 | ..... | 280.85 |
| 25. Miscellaneous..... | 129.66 | ..... | ..... | ..... |
| 26. Total..... | \$2,781.01 | \$1,546.85 | \$1,387.10 | \$4,846.00 |
| 27. Approximate number of miles run during year..... | 696 | 1,447 | 1,100 | 2,129 ¹ |
| 28. Days in commission..... | 133 | 234 | 104 | 326 |
| 29. Cost of fuel per gallon..... | 18 cents | \$0.2463 | 21 cents | Gasoline 24 cents and kerosene 11½ cents per gallon. |
| Remarks. | | | | |
| <p><i>Katherine.</i> Operated Kansas City Mo., to mouth, as required in survey work. Engineer and steerman assisted by survey party when running the boat.
¹ Staggered.</p> <p><i>Leona.</i> Operated on upper Mississippi River.</p> <p><i>Nota.</i> Operated on French Broad River.
¹ Burned on June 26, 1916.</p> <p><i>Richland.</i> Operated on Santee and Congaree Rivers, S. C. The tender did all necessary towing for Santee and Congaree Rivers and kept the dredge and snag boat supplied with fuel, etc.
¹ Lower, forward, 23 feet 4 inches; aft, 22 feet; middle (open side), 27 feet 10 inches; upper pilot, 20 feet 3 inches; cabins, 30 feet 6 inches.</p> | | | | |

1. Upper, forward, 13 feet;
aft, 18 feet; middle, 18 feet;
upper pilot, 10 feet; cabins,
11 feet.
2. Lower, forward, 9 feet;
aft, 9 feet; middle, 9 feet;
upper pilot, 9 feet 9 inches;
cabins, 7 feet 4 inches.
3. Two cabins and room for
steward, kitchen, storeroom,
and bathroom, with closet.

TABLE XVIII.—Report of operations of gasoline launches (paddle) for the calendar year ending Dec. 31, 1916—Continued.

| 1. Name. | Sylla. | Ukenuah. ¹ * | White Out. | No. 1. |
|---|--|--------------------------------|---|----------------------------|
| 2. District. | | | | |
| 3. Where built. | Mobile, Ala. | Mobile, Ala. | Chattanooga, Tenn. | Nashville, Tenn. |
| 4. When built. | Demopolis, Ala. | Pascagoula, Miss. | Jeffersonville, Ind. | Lock 7, Cumberland River. |
| | | 1916. | 1905; rebuilt by United States in 1913. | 1910. |
| 5. Builder. | Demopolis Coopertage Co. | United States | E. J. Howard | U. S. Engineer Department. |
| 6. Time to build. | Not known. | 13 months. | 3 months. | 5 months. |
| 7. Where purchased. | Demopolis, Ala. | Demopolis, Ala. | Decatur, Ala. | |
| 8. When purchased. | 1906. | | October, 1908. | |
| 9. From whom purchased. | Demopolis Coopertage Co. | | Holland-Blow Slave Co. | |
| 10. Purchase price. | \$2,500. | | \$2,500. | |
| 11. Contract cost. | \$2,500. | | \$2,500. | \$3,915.51. |
| 12. Complete cost with outfit. | \$2,700. | \$7,353.81 | | \$1,077. |
| 13. Present value. | \$1,800. | \$7,300. | | |
| 14. Hull: | | | | |
| (a) Type of hull (scow or rounded bow). | Scow. | Scow. | Scow bow. | Scow. |
| (b) Material of hull. | Wood. | Wood. | Wood. | Wood. |
| (c) Length over all. | 72 feet 2 inches, hull; 84 feet 6 inches over all. | 78 feet 6 inches. | 115 feet. | 86 feet 3 inches. |
| (d) Beam over all. | 16 feet 5 inches. | 18 feet 6 inches. | 22 feet 6 inches. | 19 feet 2 inches. |
| (e) Beam on water line. | 16 feet. | 13 feet 6 inches. | 20 feet. | 16 feet. |
| (f) Depth of hull amidship. | 2 feet 9 inches. | 3 feet 5 1/2 inches. | 3 feet 6 inches. | 1 foot 6 inches. |
| (g) Draft forward. | 11 inches. | 20 inches. | 22 inches. | 1 foot 3 inches. |
| (h) Draft aft. | 18 inches. | 26 inches. | 24 inches. | 1 foot 8 inches. |
| (i) Draft to bottom of paddle wheel. | 12 inches. | 13 inches. | 22 inches. | 11 inches. |
| (j) Displacement (long t ns). | 38. | 40. | 96. | 54. |
| (k) Speed in statute miles per hour. | 7. | 9.3. | 6. | 6. |
| 15. House: | | | | |
| (a) Length. | 53 feet 6 inches. | 53 feet 6 inches. | 80 feet. | 60 feet 4 inches. |
| (b) Width. | 12 feet. | 10 feet 7 1/2 inches. | 20 feet. | 18 feet. |
| (c) Height above deck. | 17 feet. | 12 feet 10 inches. | 8 feet. | 16 feet 10 inches. |
| (d) Accommodations. | For 4 men. | For 5 men. | 7 staterooms, kitchen, and dining room. | 6 men. |
| 16. Motors: | | | | |
| (a) Number. | 1. | 1. | 1. | 1. |
| (b) Type. | Horizontal, stationary. | Type C. O., marine oil engine. | Marine. | Horizontal, stationary. |
| (c) Make. | Fairbanks, Morse & Co. | Fairbanks, Morse & Co. | Fairbanks, Morse & Co. | Hamilton. |
| (d) When built. | Not known. | 1916. | Not known. | |
| (e) Number of cylinders (1 engine). | 1. | 4. | 2. | 1. |
| (f) Diameter of cylinders. | 11 1/2 inches. | 8 1/2 inches. | 11 inches. | 10 inches. |
| (g) Stroke. | 18 inches. | 10 inches. | 12 inches. | 16 inches. |
| (h) Revolutions per minute. | 180. | 400. | 300. | 20. |
| (i) Indicated horsepower (total). | 28. | 60. | 80. | |
| (j) Weight of 1 motor. | 10,000. | 9,500 pounds. | 8 tons. | |

| | | | | | |
|---|---|--------------------------------------|-----------------------------------|------------------------------------|--|
| 17. Paddle wheel: | 9 feet..... | 9.2 feet..... | 11 feet..... | 6 feet 8 inches..... | |
| (a) Diameter..... | 10..... | 12..... | 12..... | 10..... | |
| (b) Number of buckets..... | 10 feet 6 inches long, 10 inches wide..... | 10 feet 6 inches by 12 inches..... | 15 feet long, 16 inches wide..... | 10 feet 4 inches by 10 inches..... | |
| (c) Length and width of buckets..... | 4 inches..... | 4 1/4 inches..... | 5 inches..... | 3 inches..... | |
| (d) Diameter of shaft..... | 32..... | 36..... | 24..... | 26..... | |
| (e) Revolutions per minute..... | 3..... | 3..... | 7..... | 2..... | |
| 18. Number of men in crew..... | | | | | |
| OPERATING COST. | | | | | |
| 19. Pay roll..... | \$1,190.73 | \$2,100.00 | \$1,244.33 | \$901.17 | |
| 20. Subsistence..... | 261.43 | 800.00 | 316.69 | 178.48 | |
| 21. Fuel..... | 899.56 | 265.00 | 362.40 | 176.96 | |
| 22. Supplies (machinery)..... | 34.78 | 400.91 | 139.50 | 19.04 | |
| 23. Repairs: | | | | | |
| (a) Hull..... | 38 | | 383.13 | | |
| (b) Machinery..... | 258.01 | | 502.29 | | |
| 24. Additions and alterations..... | 158.81 | 11.17 | | | |
| 25. Miscellaneous..... | 27.27 | | 127.00 | 14.64 | |
| 26. Total..... | 4,906. | \$2,830.97 | \$3,084.34 | \$1,290.29 | |
| 27. Approximate number of miles run during year..... | 168. | 6,186 (of this 1,800 are tow miles). | 1,900. | 201. | |
| 28. Days in commission..... | 168. | 315. | 121. | 131. | |
| 29. Cost of fuel per gallon..... | Gasoline, 2.631 gallons, at 24 cents; kerosene, 3.107.5 gallons, at 10 cents. | Average 54 cents..... | 22 cents..... | 22 cents. | |
| Remarks. | | | | | |
| This boat operated on the Black Warrior and Tombigbee Rivers, towing supplies, 4,906 miles, run, at a cost of \$0.58 per mile. Towed 393-688 mile-tons of freight at a cost of \$0.0072 per ton-mile. | | | | | |
| Remarks. | | | | | |
| During the past year this boat operated on the Tombigbee River, Ala., between Demopolis and mouth working in connection with the improvement of channel and maintenance of channel and operating and care of Locks 1, 2, and 3. Occasional trips were made beyond these limits. | | | | | |
| Assisted in work on Muscle Shoals survey and at Riverton lock approach, Tennessee River. | | | | | |
| Towing snag boat and transporting supplies, etc., for snagging outfit. | | | | | |

TABLE XIX.

DRY DOCKS.

4687

TABLE XIX.—*Report of operations of dry docks for the calendar year ending Dec. 31, 1916.*

| 1. Letter or number | Lock 6, Muscle Shoals Canal, Ala. | Louisville & Portland Canal Dry Dock. | Mississippi River, first and second districts, Memphis, Tenn. | Kaukauna. | None. |
|--|---|---------------------------------------|---|----------------------------------|---------------------------------------|
| 2. District and location | Chattanooga, Tenn., Muscle Shoals Canal, Ala. | Louisville, Ky. | Mississippi River, first and second districts, Memphis, Tenn. | Milwaukee, Wis. | Mobile, Ala.; Pascagoula, Miss. |
| 3. Capacity in tons | 1,780. | 1,200. | 140. | 575. | 1,500. |
| 4. Cost of dock | | Not known. | \$9,475. | \$3,863. | \$38,546.57. |
| 5. Present value. | | \$125,000. | \$1,017.22. | \$3,890. | \$34,210. |
| TYPE. | | | | | |
| 6. Stationary: | | | | | |
| (a) Location | Muscle Shoals Canal, Ala. | Louisville & Portland Canal. | | Kaukauna, Wis., Lower Fox River. | |
| (b) Material | Concrete sides, rock bottom. | Masonry. | | Earth basin: floor, bedrock. | |
| (c) Length | 171 feet. | 235 feet 6 inches | | 130 feet. | |
| (d) Breadth | 75 feet. | 80 feet. | | 100 feet. | |
| (e) Depth | 7 feet. | 15 feet. | | 6 feet. | |
| 7. Floating: | | | | | |
| (a) Location | | | Memphis, Tenn., Government fleet. | | |
| (b) Material | | | Wood. | | |
| (c) Length | | | 145 feet. | | |
| (d) Breadth | | | 36 feet. | | |
| (e) Depth | | | 10 feet. | | |
| (f) Maximum draft of vessel that dock will take. | | | 5 feet. | | |
| (g) Number and size of pumps. | | | Pumps on steam fleet tender used. | | |
| 8. Side haul or end haul: | | | | | |
| (a) Location | | | | | West bank of Pascagoula River. |
| (b) Material | | | | | Yellow pine, creosoted. |
| (c) Number of tracks | | | | | 4. |
| (d) Number of carriages. | | | | | 1. |
| (e) Length of tracks | | | | | 350 feet. |
| (f) Depth of water over end. | | | | | 12 feet on top of 15-inch keel block. |
| (g) Dimensions of cover end. | | | | | 24 inches hauling, 14 inches backing. |
| (h) Dimensions of hauling-engine cylinders. | | | | | 10, by 12 inches. |

| | | | | | 44 inches diameter, 16 feet 8 inches long, 478 square feet; 17 square feet. |
|--|---|--|--|---|---|
| 9. Number of vessels docketed during year. | 6 | 8 | | | 22. |
| 10. Total displacement in tons of all vessels docketed. | 720.9 | 2,244 | | | 6,577. |
| 11. Number of days dock was employed. | 43 days 4 hours ¹ | 143 | | | 225. |
| 12. Average number of men employed. | | 10 ¹ | | | 544. |
| OPERATING COST. | | | | | |
| 13. Pay roll. | \$246.45. | \$45 ¹ | | | \$354.74. |
| 14. Supplies. | | | | | \$5.25. |
| 15. Repairs. | \$19,777.12 ² | \$181.16 | | | \$102.80. |
| 16. Fuel. | | (³) | | | \$61.67. |
| 17. Average cost of docking and undocking per ton of displacement. | \$0.341 | \$0.0109 | | | \$0.0892. |
| | | | Remarks. | Remarks. | |
| | Dock is used for repairs only and not used regularly, so no permanent force is employed, and cost of docking and undocking is not kept as the men employed on the repairs to the work and cost is included in the repairs and is a very small per cent of the work. | ¹ Idle 5 months to permit alterations to be made. ² Installation of new dock gates, new miter sill, porous dam, and increasing width of concrete blocks. | ¹ Part of fleet labor gang; cost represents distribution of labor for the time employed in docking and undocking vessels. ² Fuel cost included in operating cost for fleet tender. | This dry dock consists of a basin 100' by 130 feet, adjacent to Kaukauna third lock, and is provided with regular lock gates. It is filled by gravity through valves in gates and emptied by gravity through culvert into pool below lock; no men are regularly employed; cost of docking is nominal. | |

TABLE XIX.—*Report of operations of dry docks for the calendar year ending Dec. 31, 1916.*

| 1. Letter or number..... | Lock 6, Muscle Shoals Canal, Ala. | Louisville & Portland Canal Dry Dock. | Kaukauna. | None. |
|--|---|---------------------------------------|-----------------------------------|---------------------------------------|
| 2. District and location..... | Chattanooga, Tenn., Muscle Shoals Canal, Ala. | Louisville, Ky. | Milwaukee, Wis. | Mobile, Ala.; Pascagoula, Miss. |
| 3. Capacity in tons..... | 1,780. | 1,200..... | 575..... | 1,500..... |
| 4. Cost of dock..... | | Not known. | \$3,803..... | \$38,546.57. |
| 5. Present value..... | | \$125,000..... | \$3,800..... | \$34,210. |
| TYPE. | | | | |
| 6. Stationary: | Muscle Shoals Canal, Ala. | Louisville & Portland Canal. | Kaukauna, Wis., Lower Fox River. | |
| (a) Location..... | | | Earth basin: floor, bedrock. | |
| (b) Material..... | Concrete sides, rock bottom. | Masonry..... | 130 feet. | |
| (c) Length..... | 171 feet. | 235 feet 6 inches. | 100 feet. | |
| (d) Breadth..... | 75 feet. | 80 feet. | 6 feet. | |
| (e) Depth..... | 7 feet. | 15 feet. | | |
| 7. Floating: | | | Memphis, Tenn., Government fleet. | |
| (a) Location..... | | | Wood. | |
| (b) Material..... | | | 145 feet. | |
| (c) Length..... | | | 36 feet. | |
| (d) Breadth..... | | | 10 feet. | |
| (e) Depth..... | | | 5 feet. | |
| (f) Maximum draft of vessel that dock will take. | | | Pumps on steam fleet tender used. | |
| (g) Number and size of pumps. | | | | |
| 8. Side haul or end haul: | | | | |
| (a) Location..... | | | | West bank of Pascagoula River. |
| (b) Material..... | | | | Yellow pine, creosoted. |
| (c) Number of tracks..... | | | | 4. |
| (d) Number of carriages..... | | | | 1. |
| (e) Length of tracks..... | | | | 350 feet. |
| (f) Depth of water over end. | | | | 12 feet on top of 15-inch keel block. |
| (g) Dimensions of chais. | | | | 24 inches hauling, 14 inches backing. |
| (h) Dimensions of chais—length..... | | | | 10 by 12 inches. |

TABLE XIX.—*Report of operations of dry docks for the calendar year ending Dec. 31, 1916—Continued.*

| 1. Letter or number. | 2. District and location. | 3. Capacity in tons. | 4. Cost of dock. | 5. Present value. | TYPE. | 6. Stationary: | 7. Floating: | 8. Side haul or end haul: | 9. Number of vessels docked during year. | 10. Total displacement in tons of all vessels docked. | 11. Number of days dock was employed. | 12. Average number of men employed. | 1015. |
|----------------------|---|----------------------|------------------|-------------------|-------|---|--|--|--|---|---------------------------------------|-------------------------------------|-------|
| | New Orleans (fourth Mississippi River). | 100 | \$5,000 | \$4,400 | | (a) Location.
(b) Material.
(c) Length.
(d) Breadth.
(e) Depth. | Rock Island-Keokuk, Iowa.
5,000
Built by Power Co., \$250,000.
\$250,000. | Right bank Mississippi River,
West Memphis, Ark.
Timber, concrete, and steel.
12
6
314 feet 9 inches.
16 feet 5 inches at zero stage,
Memphis gauge.
14 inches.
12 by 16 inches.
Steam from plant boiler house.
do. | 37.
3,817.6.
311.
16. | | | | |
| | St. Louis, Mo., Mississippi River Commission. | 1,500 | \$85,120 | \$80,000 | | (a) Location.
(b) Material.
(c) Length.
(d) Breadth.
(e) Depth. | Adjoining lock at Keokuk, Iowa.
Concrete, stone, steel gates.
410 feet.
140 feet.
11 feet on miter sill. | U. S. fleet, Vicksburg, Miss.
Steel.
158 feet 8 inches.
56 feet 5 inches.
16 feet 3 inches.
8 feet.
Two 8-inch centrifugal. | | | | | |

OPERATING COST.

| | | | | | |
|--|----------|---|--|--|---|
| 13. Pay roll..... | \$155.1 | | | | |
| 14. Supplies..... | \$763.09 | | | | |
| 15. Repairs..... | \$514.71 | | | | |
| 16. Fuel..... | \$31 | | | | |
| 17. Average cost of docking and undocking per ton of displacement. | (1) | | | | |
| | | Remarks. | Remarks. | Remarks. | Remarks. |
| | | The operating cost consists of 6 new cradles, care of dock and buildings, and leveling buildings on account of settlement of new ground.
1 All expenses charged in with construction and repair of boats. The estimated cost per ton is 5 cents. Of the 57 boats docked 6 were commercial boats, from which there was received in fees, etc.: Dockage fees, \$1,602.50; use of tools, \$399.30; total, \$2,001.80. | At zero stage on Memphis gauge a boat drawing 5 feet can be docked.
1 Dock is operated by regular fleet labor gang of about 10 men. | Dock operated by regular carpenter and machinist force, at Vicksburg fleet. Carpenter boat No. 073 furnishes steam for pumping out dock. | \$291.24.
\$12.50.
\$55.50.
\$0.004. |

TABLE XX.

BOAT-BUILDING PLANT.

4673

TABLE XX.—*Boat-building plants.*

| 1. District..... | Chattanooga, Tenn. | | Cincinnati, Ohio, second. | |
|-------------------------------|---|-------------------------------|--|---|
| | Chattanooga, Tenn..... | Muscle Shoals Canal, Ala..... | Near Fort Gay, in West Virginia. | McConnellsville, Ohio..... |
| 2. Location..... | | | 4..... | 1..... |
| 3. Number of buildings..... | 3..... | 2..... | 2 concrete and cement blocks and 2 frame. | 1..... |
| 4. Material of buildings..... | 1 corrugated metal; 2 frames. | Wood. | Construction and repair work | Wood. |
| 5. Usage of buildings..... | Warehouse, blacksmith, and sawmill. | Workman's shed and storeroom. | On Government ground. | Workshop..... |
| 6. Cost of yard (completed). | \$11,394, estimated. | | \$500. | Old boat hull, \$200; machinery, \$2,500. |
| 7. Cost of buildings..... | Warehouse, \$3,649.92; others unknown. | | \$5,500. | \$300. |
| 8. Present value..... | \$3,284 for warehouse. | | \$5,000. | \$3,000. |
| 9. Acreage..... | About 2 acres. | | 1 acre. | 5/100. |
| 10. Number of men employed. | 21. | 54 acres. | 7. | 7. |
| 11. Operating cost per year. | \$15,578.94. | \$12,153.31. | \$4,680. | Not regularly operated. |
| 12. Character of work done. | (Constructing and repairing floating plant.) | Repair of floating plant. | Construction of dam and boat parts, and general repair work. | Built 4 small steel flatboats. |
| | Remarks. | | | Remarks. |
| | Constructed barge No. 86, drill rafts 32, 33, and 34, and 15 wooden skiffs; repaired dredge Nollchucky, dredge Kwassind, steamer Hiwassee, steamer Ocoee, survey quarter boat cabin No. 1; quarter boats Nos 3, 5, 7, and 10; derrick boats 7 and 8; dump scow No. 6, barges 28-R, 57, 75, and 86, and now have under construction dump scow 13 and drill raft No. 35 and under reconstruction quarter boat No. 3 and derrick boat No. 4. | | | The principal use of the plant is for constructing and repairing lock gates and other lock appurtenances. |

TABLE XX.—*Boat-building plants—Continued.*

| 1. District..... | Mobile, Ala. | | Kansas City, Mo. |
|----------------------------------|---|--|---|
| 2. Location..... | Tuscaloosa, Ala..... | Pascagoula, Miss..... | Gasconade, Mo..... |
| 3. Number of buildings..... | 3..... | 7..... | 9..... |
| 4. Material of buildings..... | Wood..... | Wood, galvanized iron, and composition roofing. ¹ | Wood and brick..... |
| 5. Use of buildings..... | Storeroom, carpenter shop, blacksmith shop..... | Storerooms protecting machinery, blacksmith shop, etc. | (1)..... |
| 6. Cost of yard (completed)..... | \$17,447.83..... | \$47,575.33 ² | Not completed..... |
| 7. Cost of buildings..... | \$1,372.30..... | \$2,189.85..... | No record..... |
| 8. Present value..... | \$1,000 for buildings, \$15,000 for yard..... | \$45,200..... | \$26,600..... |
| 9. Acreage..... | 2.7..... | 4.6..... | 17.86..... |
| 10. Number of men employed..... | 24..... | 4 to 51..... | 50 to 150..... |
| 11. Operating cost per year..... | \$12,799.66..... | \$17,845.15 ³ | Construction and repairs of floating plant; also used as a supply yard for field parties. |
| 12. Character of work done..... | See Remarks..... | (1)..... | Remarks:
A general harbor for plant operating between Kansas City and the mouth of the river (Missouri) and on the Osage and Gasconade Rivers.
1 Machine shop, mill and blacksmith shop, oil house, dynamite house, ice house, warehouses, office, and residence. |
| | Remarks:
The force at the boat yard were employed making repairs to pipe-line dredge Chas. Humphreys and minor repairs to pipe-line dredge No. 6, repairs to steamer Nugent, snag boat R. C. McCalla, and minor repairs to derrick boats, quarter boats, and barges, rebuilding 1 guard crib at Locks 13, building fishways at Locks 11 and 12, replacing miter posts in gates at Locks 4, 6, and 6, painting and repairs to lock houses, Lock 4, erecting steel barge No. 20, and constructing sanitary closets, etc. | Remarks:
1 2 buildings have wood sides and composition roofing, the others have galvanized iron sides and roofs.
2 Includes cost of constructing marine ways.
3 Represents cost of doing work explained under item 12.
4 Hauled out and repaired the following plants: 1 scowling hopper dredge, 3 hydraulic pipe-line dredges with their attendant plants, consisting of tug-boats, launches, pontoon lines, coal and water barges, 3 snag boats and attendant barges, and 1 survey launch and 1 additional launch and tug. | Remarks:
This yard is used as a harbor for plant operating above Fort Pierre, S. Dak.
1 Does not include cost of repairs to plant. |

| 1. District..... | Kansas City, Mo. | New Orleans (fourth Mississippi River). | Pittsburgh, Pa. | Rock Island. |
|----------------------------------|--|---|---|---|
| 2. Location..... | Sioux Ice Harbor, S. Dak. | New Orleans, La. | Lock 4, Pa. | Fountain City, Wis. |
| 3. Number of buildings..... | 3. | 2. | 9. | 10. |
| 4. Material of buildings..... | Wood. | Wood and galvanized iron. | Wood and steel. | Wood. |
| 5. Usage of buildings..... | Warehouse: 1 machine and carpenter shop, 1 lumber shed. | Warehouse, machine, and carpenter shop. | (1). | Mill, engine and boiler house and shop. |
| 6. Cost of yard (completed)..... | No record. | About \$20,000. | | \$36,187.90. |
| 7. Cost of buildings..... | do. | \$8,000. | | \$4,870. |
| 8. Present value..... | \$24,000 (estimated). | \$8,000. | | \$20,460.82. |
| 9. Acreage..... | 2. | About 10 acres. | | 2.42. |
| 10. Number of men employed..... | 2 watchmen regularly; small force when work warrants. | Variable; about 56. | Between 34 and 43 men. | 18. |
| 11. Operating cost per year..... | \$1,800 (estimated). | | \$38,175.62. | \$10,323.93. |
| 12. Character of work done..... | Construction of and alterations and repairs to wooden plant and repairs to steaming boats. | Construction and repair of wooden hulls assembling steel hulls and repairing same. | (1). | Care and repair of floating plant and storehouse for lighthouse supplies. |
| | <i>Remarks.</i>
1 Does not include construction and repairs to plant as the operating cost depends on amount of work. | <i>Remarks.</i>
The boat-building plant is operated in connection with the force employed at the Engineer depot for the repair, maintenance, and care of the plant of the district. There is no separate operating cost. | <i>Remarks.</i>
1 Warehouse, boilerhouse, machine shop, forge shop, sawmill, planing mill, carpenter shop, office, and superintendent's residence.
2 Building and repairing boats, hulls, and superstructures, repairing boat machinery, making repairs for locks and dams on the Monongahela River, and building wharves, etc., for locks and dams on the Ohio and Allegheny Rivers. | |

TABLE XX.—*Boat-building plants—Continued.*

| 1. District. | Rock Island, Ill. | St. Louis, Mo. | Mississippi River, third. |
|------------------------------|--|---|--|
| 2. Location. | Keokuk, Iowa. | St. Louis, Mo. | Vicksburg, Miss. |
| 3. Number of buildings. | 10. | 12. | 1. |
| 4. Material of buildings. | 3 brick, 7 wood. | 6 steel, 6 wood. | Crested pile foundation; wood and galvanized iron house. |
| 5. Usage of buildings. | Office, blacksmith shop, sawmill, storehouse, machine and paint shop, tool, ice, and engine house. | (1) | Warehouse. |
| 6. Cost of yard (completed). | See dry dock report. | Land owned by Quartermaster Corps. | \$14,263.14. |
| 7. Cost of buildings. | \$30,000. | \$30,000. | \$10,263.14. |
| 8. Present value. | \$28,000. | \$8,500. | \$13,000. |
| 9. Acreage. | 2. | 94. | About 6 acres at low water. |
| 10. Number of men employed. | 13. | 100 to 200 (on repairs). | 30 to 100. |
| 11. Operating cost per year. | \$1,307.80. | Repairs to snag boats, steam-boats, and dredges; repairs to boats and reconstruction of steam tenders, derrick boats, quarter-boats, office boats, barges, flat-boats, skiffs, and yawls. | \$100,000. |
| 12. Character of work done. | Construction and repair of floating plant. | | Repairing boats and barges and building new barges. |
| | <i>Remarks.</i>
This boat-building plant is part of the dry-dock equipment and is not a separate plant. | <i>Remarks.</i>
Also at this Engineer depot all materials, supplies, tools, and appliances, and subsistence stores are collected after purchase for distribution to construction works throughout the district. Contains a small laboratory for testing coal, materials, and supplies.
1 One steel boiler room, engine room, machine shop, blacksmith shop, and sawmill; 1 steel sheet-iron and boiler shop; 1 steel paint shop; 1 steel warehouse; 1 steel lumber shed; 1 steel coal shed; 2 wood warehouses, ship stores, commissary stores, mess and kitchen outfit; 2 wood carpenter shops; 1 wood office; 1 marine ways for light vessels. | <i>Remarks.</i>
This property was acquired in order to transfer storehouse and shop buildings from floating hulls to the bank. It is expected to transfer all shop buildings to the shore when the hulls on which they are now maintained become unserviceable. |

sheds, 1 tool house, 1 experimental tank shed, 1 creosoted office, 1 cookhouse, 1 blacksmith shop (sheet-iron covered), 1 office and storeroom in three sections.
 1 (are, repair, and construction of United States floating plant, storehouse for Engineer and lighthouse materials, supplies, outfit, and tools, and winter harbor.

TABLE XXI.

FLOATING PLANTS UNDER CONSTRUCTION.

4681

TABLE XXI.—*Floating plant under construction Dec. 31, 1916.*

| 1. District..... | Chattanooga, Tenn. | Chicago, Ill. | First, Cincinnati, Ohio. | Second, Cincinnati, Ohio. | Galveston, Tex. |
|---|--|---|--|--|---|
| 2. Type and name..... | Dump scow No. 18..... | 350-ton barge No. 10..... | Barges Nos. 15 and 24..... | Maneuver boat No. 5A..... | V-bottom gas oil line launch St. Joseph. |
| 3. Stern wheel or screw..... | 73 feet..... | 120 feet..... | 110 feet..... | 60 feet..... | Screw. |
| 4. Length..... | 20 feet..... | 28 feet..... | 24 feet..... | 26 feet..... | 22 feet. |
| 5. Beam..... | 6 feet..... | 5 feet 6 inches..... | 5 feet..... | 3 feet 6 inches..... | 5 feet. |
| 6. Depth..... | 6 feet..... | Wood..... | Steel..... | Steel..... | 2 feet 5 inches. |
| 7. Material of hull..... | Wood..... | United States, by hired labor..... | Steel..... | American Bridge Co..... | Cypress. |
| 8. Builder..... | U. S. Engineer Department, Chattanooga, Tenn. | U. S. Engineer Department, Peoria, Ill. | Stacy Manufacturing Co., Cincinnati, Ohio..... | U. S. Engineer Department, Ambridge, Pa..... | U. S. Engineer Department, Port Aransas, Tex. |
| 9. Location of yard..... | Chattanooga, Tenn. | Peoria, Ill. | Cincinnati, Ohio..... | Ambridge, Pa..... | Port Aransas, Tex. |
| 10. Contract cost..... | \$3,700 estimated. | Chattanooga, Tenn. | \$5,730 each..... | \$6,000..... | \$550. |
| 11. Construction appropriation..... | Above Chattanooga, Tenn. | Above Chattanooga, Tenn. | \$7,000 each..... | \$8,000..... | Improving Port Aransas. |
| 12. Date of award of contract or commencing construction..... | Oct. 12, 1916..... | July, 1916..... | Sept. 13, 1915..... | Apr. 24, 1916..... | Oct. 1, 1916. |
| 13. Probable date of completion..... | Uncertain..... | Mar. 1, 1917..... | Feb. 15, 1917..... | Mar. 1, 1917..... | Jan. 15, 1917. |
| 14. Percentage of completion..... | 10..... | 6..... | 90..... | 97..... | 95. |
| | Remarks.
Date of completion of dump scow uncertain, due to material not having been received. | | | Remarks.
Steel hull is completed; derrick completed, ready for assembly. Work on cabin has not begun.
The steel hull was constructed under contract by the American Bridge Co., the machinery was transferred from old maneuver boat No. 3 and the steel derrick and cabin is under construction by the United States. | |

| 1. District..... | Galveston, Tex. | Kansas City, Mo. | Mississippi River, first and second districts, Memphis, Tenn. |
|---|---|---|---|
| 2. Type and name..... | Tunnel stern gasoline launch Hidalgo. | Barge No. 169. | Material barge No. 1701. |
| 3. Stern wheel or screw..... | Screw..... | Towboat Edward M. Baldwin. | 120 feet. |
| 4. Length..... | 28 feet..... | 100 feet..... | 80 feet..... |
| 5. Beam..... | 8 feet 3 inches..... | 24 feet..... | 30 feet..... |
| 6. Depth..... | 3 feet..... | 5 feet..... | 4 feet..... |
| 7. Material of hull..... | Wood..... | Steel..... | 7 feet..... |
| 8. Builder..... | U. S. Engineer Department..... | U. S. Engineer Department..... | United States, Government |
| 9. Location of yard..... | Port Point, Galveston, Tex..... | Gasconade, Mo..... | fleet labor. |
| 10. Contract cost..... | \$2,000..... | \$2,700; Missouri River, Kansas City to mouth. | \$5,000. |
| 11. Construction appropriation..... | Improving Brazos River, Velasco to Old Washington. | \$45,000; Improving Missouri River, Kansas City to mouth. | Improving Mississippi River. |
| 12. Date of award of contract or commencing construction..... | Aug. 2, 1916..... | Jan. 2, 1916..... | Nov. 7, 1916. |
| 13. Probable date of completion..... | Feb. 15, 1917..... | Mar. 1, 1917..... | Jan. 20, 1917. |
| 14. Percentage of completion..... | 60..... | 65..... | 60. |
| | Remarks.
Engines and parts have been received; boiler to be delivered about Jan. 15, 1917. | Remarks.
Materials on hand; work in progress. | Remarks.
Materials on hand; work in progress. |

TABLE XXI.—*Floating plant under construction Dec. 31, 1916—Continued.*

| 1. District..... | Mississippi River, first and second districts, Memphis, Tenn. | | | | Milwaukee, Wis. | Mobile, Ala. |
|---|---|-----------------------------|-----------------------|-----------------------|-----------------|---------------------------------------|
| | Material barge No. 1703. | Material barge No. 1702. | Side dump scow No. 1. | Side dump scow No. 2. | | |
| 2. Type and name..... | Material barge No. 1703. | Material barge No. 1702. | Side dump scow No. 1. | Side dump scow No. 2. | | |
| 3. Stern wheel or screw..... | 120 feet. | 120 feet. | 70 feet 6 inches. | 70 feet 6 inches. | | Gasoline launch Moss Point. |
| 4. Length..... | 30 feet. | 30 feet. | 18 feet. | 18 feet. | | Screw. |
| 5. Beam..... | 7 feet. | 7 feet. | 6 feet 2 inches. | 6 feet 2 inches. | | 10 feet. |
| 6. Depth..... | Unrosted wood. | Unrosted wood. | Wood. | Wood. | | 12 feet 3 inches. |
| 7. Material of hull..... | United States, Government | United States, Government | United States. | United States. | | 12 feet 7 inches. |
| 8. Builder..... | feet labor. | feet labor. | United States. | United States. | | Wood. |
| 9. Location of yard..... | Memphis, Tenn. | Memphis, Tenn. | Kaukauna, Wis. | Kaukauna, Wis. | | United States. |
| 10. Contract cost..... | \$5,000. | \$5,000. | \$3,600. | \$3,600. | | Pascagoula, Miss. |
| 11. Construction appropriation..... | Improving Mississippi River | Improving Mississippi River | Jan. 28, 1916. | Jan. 24, 1916. | | \$4,000. ¹ |
| 12. Date of award of contract or commencing construction..... | Dec. 20, 1916. | Dec. 8, 1916. | Jan. 28, 1916. | Jan. 24, 1916. | | Pascagoula Harbor, Miss. |
| 13. Probable date of completion..... | Feb. 10, 1917. | Jan. 30, 1917. | Apr. 1, 1917. | Apr. 1, 1917. | | Oct. 20, 1916. |
| 14. Percentage of completion..... | 5. | 15. | 82. | 85. | | Apr. 1, 1917. |
| | | | | | | 20. |
| | | | | | | Remarks. |
| | | | | | | ¹ Expenditures authorized. |

| 1. District..... | Mobile, Ala. | New Orleans, La. | | Second New York. | | Norfolk, Va. |
|---|---|---|---|--|----------------------|---|
| | | Fuel barge No. 4..... | Fuel barge No. 5..... | Gasoline launch (screw) Drift. | Derrick boat No. 14. | |
| 2. Type and name..... | Steel deck barge No. 30..... | | | | | |
| 3. Stern wheel or screw..... | | | | | | |
| 4. Length..... | 100 feet..... | 50 feet..... | 40 feet..... | Screw..... | Nonpropelling. | |
| 5. Beam..... | 24 feet..... | 22 feet 8 inches..... | 16 feet..... | 18 feet..... | 83 feet 7 inches. | |
| 6. Depth..... | 7 feet..... | 5 feet..... | 5 feet..... | 5 feet..... | 30 feet 1 inch. | |
| 7. Material of hull..... | Steel..... | Wood..... | Wood..... | 1 foot..... | 6 feet. | |
| 8. Builder..... | United States..... | Engineer Department (hired labor). | Engineer Department (hired labor). | Wood..... | W. E. Thomas & Co. | |
| 9. Location of yard..... | Tuscaloosa, Ala..... | Plaquemine, La..... | Keystone Lock, Bayou Teche, La. | W. C. Diabrow, jr..... | Norfolk, Va. | |
| 10. Contract cost..... | | \$1,500 (estimated). | \$700..... | Brooklyn, N. Y..... | | |
| 11. Construction appropriation..... | M. & I. of Ex. R. & H. Wks. L. & D. Bk. War. & Tomb. Riv., Ala. | Various appropriations, New Orleans, La., district. | Various appropriations, New Orleans, La., district. | Ambrose Channel, maintenance and improvement of existing river and harbor works. | \$17,607.90. | Inland waterway, Norfolk, Va., to Beaufort Inlet, N. C. |
| 12. Date of award of contract or commencing construction..... | Dec. 1, 1915..... | Dec. 15, 1916..... | Nov. 15, 1916..... | May 4, 1916..... | June 19, 1916. | |
| 13. Probable date of completion..... | Apr. 15, 1917..... | Mar. 1, 1917..... | Feb. 1, 1917..... | May 26, 1916..... | Jan. 13, 1917. | |
| 14. Percentage of completion..... | 80..... | 5..... | 75..... | 100..... | 98.6. | |
| <p><i>Remarks.</i></p> <p>Work was suspended on this barge for several months and was only resumed about the end of the year.</p> | | | | | | |

TABLE XXI.—*Floating plant under construction Dec. 31, 1916—Continued.*

| 1. District..... | Philadelphia, Pa. | | Pittsburgh, Pa. | | Portland, Oreg. (first). |
|--|---|--|---|---|---------------------------------------|
| 2. Type and name..... | Rock drill No. 8..... | Deck scows Nos. 13 and 14..... | Derrick boat No. 1..... | Derrick boat No. 4..... | Gasoline launch (screw),
Tumwater. |
| 3. Stern wheel or screw..... | 70 feet. | 60 feet. | 70 feet. | 70 feet. | Screw. |
| 4. Length..... | 30 feet. | 22 feet. | 32 feet. | 32 feet. | 22 feet. |
| 5. Beam..... | 7 feet. | 5 feet 11 inches. | 3 feet 8 inches. | 3 feet 8 inches. | 3 feet 6 inches. |
| 6. Depth..... | Wood. | Wood (rescued). | Wood. | Wood. | Wood. |
| 7. Material of hull..... | See below. | John H. Mails Co.
Camden, N. J. | United States
Boat yard, Lock 4, Pa. | United States
Boat yard, Lock 4, Pa. | U. S. Engineers. |
| 8. Builder..... | | | | | Portland, Oreg. |
| 9. Location of yard..... | | | | | \$2,000. |
| 10. Contract cost..... | Delaware River, Pa. and
N. J. (at Trenton, N. J.). | \$5,000 each. | \$0,300. | \$7,500. | Dalles-Cello Canal. |
| 11. Construction appropriate to
station..... | | Dec. 1, 1916. | | | Dec. 1, 1916. |
| 12. Date of award of contract or commencing
construction..... | Mar. 15, 1917. | May 27, 1917. | May, 1916. | December, 1916. | Mar. 15, 1917. |
| 13. Probable date of completion..... | 80 per cent. | | Completed. | Completed. | 25 per cent. |
| 14. Percentage of completion..... | <i>Remarks.</i>
Rock drill No. 8 is being constructed by repairing the old hull of derrick boat Racer, the installation of two spare upright boilers with engines, one spare rock drill, and the purchase of the necessary additional rock-drilling outfit.
Repairs to scow were made by Quigley & Dorp, Camden, N. J., at a cost of \$4,000. The installation of all machinery and the erection of the house are being made by Government employees. | <i>Remarks.</i>
Material being assembled; no actual work of construction begun. | | | |

| 1. District..... | | Portland, Ore. (second). | | Third Mississippi River. | | Washington, D. C. | | Wheeling, W. Va. | |
|---|--|--|--|--|--|---|--|---|--|
| 2. Type and name..... | | Pile driver No. 3..... | | Scow barges, Nos. 1701 to 1712, inclusive. | | 1014, hydraulic grader..... | | 14 pipe-line pontoons, No. 50 to 64. | |
| 3. Stern wheel or screw..... | | Nonpropelling..... | | 120 feet each..... | | 120 feet..... | | 63 feet (hull, 63 feet; fantail, 13 feet). | |
| 4. Length..... | | 66 feet..... | | 30 feet each..... | | 30 feet..... | | Stern wheel 12 feet. | |
| 5. Beam..... | | 23 feet..... | | 7 feet each..... | | 7 feet..... | | 2 feet 10 inches. | |
| 6. Depth..... | | 3 feet 6 inches..... | | Crossed yellow pine..... | | Steel..... | | Wood. | |
| 7. Material of hull..... | | Wood..... | | Third district Government fleet. | | U. S. third district fleet..... | | By hired labor. | |
| 8. Builder..... | | U. S. Engineer Department..... | | Third district Government fleet. | | Vicksburg, Miss..... | | United States. | |
| 9. Location of yard..... | | Government moorings, Portland, Ore..... | | Vicksburg, Miss..... | | Vicksburg, Miss..... | | Dam No. 21, Ohio River. | |
| 10. Contract cost..... | | (1)..... | | \$4,500 each (estimated)..... | | \$45,000 (estimated)..... | | \$3,500 (estimated). | |
| 11. Construction appropriation..... | | Williamette and Yamhill Rivers, Ore..... | | Mississippi River..... | | do..... | | Reclamation of Anacostia River Flats, D. C. | |
| 12. Date of award of contract or commencing construction..... | | Nov. 1, 1916..... | | Dec. 15, 1916..... | | Dec. 15, 1916..... | | February, 1916. | |
| 13. Probable date of completion..... | | Jan. 31, 1917..... | | June 1, 1917..... | | June 30, 1917..... | | April, 1917. | |
| 14. Percentage of completion..... | | 44..... | | About 20..... | | About 5..... | | 96 per cent. | |
| | | <i>Remarks.</i> | | <i>Remarks.</i> | | <i>Remarks.</i> | | <i>Remarks.</i> | |
| | | 1 \$4,000 authorized for its construction. | | Twelve barges, under subproject for "Plant, third district," approved Aug. 17, 1916 (E. D. 16627/286). | | For use with United States pipe-line dredge Dalecarlia. Cost, estimated, \$60 apiece. | | | |

TABLE XXII.

CONCRETE-MIXING PLANTS.

4589

TABLE XXII.—*Concrete-mixing plant, Dec. 31, 1916.*

| No. 1. | Patent No. 1. | Barge No. 1. | Material used No. 1. |
|-----------------------------------|--|--|---|
| 1. Name..... | Fourth district, Mississippi River | Second, Portland, Ore. | Buffalo, N. Y. |
| 2. District..... | Hard Times and Giles Bends.... | Willamette River, Ore. (Wiltonville Falls). | Great South and Little South Harbors, N. Y. |
| 3. Where operated..... | U. S. Engineer depot, New Orleans, La. | Portland, Ore. | Oswego, N. Y. |
| 4. Where built..... | 1915..... | 1915..... | 1911..... |
| 5. When built..... | U. S. Engineers..... | U. S. Engineer Department..... | U. S. Engineer Department..... |
| 6. Builder..... | 3 months..... | 3 months..... | 3 months..... |
| 7. Time to build..... | Wood..... | Wood..... | Wood..... |
| 8. Material of hull..... | \$3,940.30..... | \$3,600..... | \$1,300..... |
| 9. Cost of hull..... | \$9,550.09..... | \$1,850 (secondhand)..... | \$973.25..... |
| 10. Cost of machinery..... | \$8,724.81..... | \$8,000..... | \$2,373.25..... |
| 11. Total cost..... | \$12,684.81..... | \$7,200..... | \$1,650..... |
| 12. Present value..... | \$10,800..... | 90 feet..... | 70 feet..... |
| 13. Length..... | 80 feet..... | 124 feet..... | 90 feet..... |
| 14. Beam..... | 36 feet..... | 30 feet..... | 22 feet..... |
| 15. Depth..... | 6 feet 11 inches..... | 7 feet 7 inches..... | 6 feet 5 inches..... |
| 16. Draft forward..... | 3.25 inches..... | 2 feet 4 inches..... | 2 feet..... |
| 17. Draft aft..... | 2.85 inches..... | 2 feet 5 inches..... | 2 feet..... |
| 18. Displacement (long tons)..... | 238.1..... | 146..... | 2 feet..... |
| 19. Type of mixing plant..... | (one)..... | Conse..... | Chicago Improved cube mixer |
| 20. Maker..... | Smith..... | Municipal Engineering & Contracting Co., Chicago, Ill. | Chicago Improved cube mixer |
| 21. Size..... | 1 yard..... | 1 cubic yard..... | 2-bag batch..... |
| 22. Capacity per hour..... | 60 cubic yards..... | 11 cubic yards..... | 20 cubic yards..... |
| 23. Size of main engine..... | 84 by 10 inches..... | 9 by 9 inches (mixer engine)..... | 84 by 64 inches..... |
| 24. Boiler..... | 16 feet 11 inches..... | 12 feet..... | 6 feet 9 inches..... |
| (a) Height..... | 4 feet..... | 5 feet..... | 30 inches..... |
| (b) Diameter..... | 527 square feet..... | 1,022 square feet..... | 31 square feet..... |
| (c) Heating surface..... | 174 square feet..... | 20 square feet..... | 100 pounds..... |
| (d) Grate surface..... | 125 pounds..... | 100 pounds..... | None..... |
| (e) Working pressure..... | "A" frame, 86 feet..... | 14 by 14 inches by 32 feet..... | Do..... |
| 25. Derrick..... | (a) Dimensions of mast..... | 12 by 12 inches by 55 feet..... | Double cylinder, double drum..... |
| (a) Dimensions of mast..... | (b) Dimensions of boom..... | Monotype ore bowl clamshell..... | Carlin & Sons, Pittsburgh, Pa. |
| (b) Dimensions of boom..... | (c) Type..... | 1 cubic yard..... | 2..... |
| 26. Bucket..... | (a) Type..... | Double friction drum hoist engine..... | 64 by 10 inches..... |
| (a) Type..... | (b) Capacity..... | Lambert Hoist & Engine Co..... | 84 by 10 inches..... |
| (b) Capacity..... | (c) Type..... | Double friction drum hoist engine..... | 84 by 10 inches..... |
| 27. Hoisting engine..... | (a) Make..... | American..... | 2..... |
| (a) Make..... | (b) Number of drums..... | 2 tandem friction drums..... | 84 by 10 inches..... |
| (b) Number of drums..... | (c) Dimensions of cylinders..... | 84 by 10 inches..... | 84 by 10 inches..... |
| (c) Dimensions of cylinders..... | | | |

TABLE XXII.—Concrete-mixing plant, Dec. 31, 1916—Continued.

| Name..... | No. 1. | Paver No. 1. | Barge No. 1. | Material scow No. 14. |
|---|----------------------|---|--|--|
| 28. Swinging engine: | Power crab..... | Attachment to main hoist engine..... | None..... | None. |
| (a) Type..... | Dako..... | Lambert type..... | | |
| (b) Make..... | 2..... | 2..... | | |
| (c) Number of drums..... | 5.8 by 1.3 feet..... | None..... | | |
| (d) Dimensions of mixers..... | 200 gallons..... | 54 by 54 by 54 inches..... | None..... | 3 feet 10 inches square. |
| 29. Dimensions of mixing hopper..... | | 26 by 35 inches..... | 26 by 40 inches..... | 12 by 19 by 24 inches. |
| 30. Dimensions of water tank..... | | | | |
| 31. Average number of batches: | | | | |
| (a) Per hour..... | 45..... | 14..... | 8.3..... | 30. |
| (b) Per day..... | 216..... | 113..... | 43..... | 200. |
| (c) Per week..... | 1..... | 1.11..... | 0.65..... | 3,000. |
| 32. Cubic yards of concrete per batch..... | 10,378.8..... | 9,267..... | 5,021.3..... | |
| 33. Total number of cubic yards mixed during year..... | 48..... | 74..... | 117..... | 104. |
| 34. Number of days worked..... | \$3,598.27..... | \$3,410.29..... | \$3,380.80..... | \$12,451.77. |
| 35. Total cost of operations during year (all charges)..... | \$1,133.53..... | \$76.64..... | \$69.36..... | \$542.24. |
| 36. Total cost of repairs..... | 0.35..... | \$2.278..... | \$0.675..... | \$4.03. |
| 37. Cost per cubic yard..... | 13..... | 20..... | 16..... | 19. |
| 38. Number of men in crew..... | | | | |
| | | Remarks. | Remarks. | Remarks. |
| | | Used in the manufacture of 5,570 tons of concrete ballast, and for paving 450,013 square feet of bank with concrete paving 4 inches thick in Hard Times Bend, Marengo Bend, Kempe Bend, and Giles Bend. | Includes \$2,550, cost of upper works.
The plant worked intermittently in a lock canal and was subject to frequent interruption by traffic. | This scow is also equipped with an air-compressor plant, and the scow was engaged in framing and placing leveling, but the cost of this work is not included in the above statement. |

| 1. Name. | No. 17, Hudson River. | No. 65, Mixer Boat, U. S. E. D. Whetting. | No. 1508. | No. 1509. |
|-------------------------------|-----------------------------|--|--|----------------------------------|
| | | | | |
| 2. District. | First, New York. | Wheeling, W. Va. | Mississippi River, first and second districts, Memphis, Tenn. | Third, Mississippi River. |
| 3. Where operated. | Hudson River at Troy, N. Y. | Dam Nos. 21 and 22, Ohio River. | Mississippi River at various places. | On Mississippi River. |
| 4. Where built. | Albany, N. Y. | Dams Nos. 21 and 22, Ohio River. | Memphis, Tenn. | Vicksburg, Miss. |
| 5. When built. | 1911. | 1916. | 1913. | 1916. |
| 6. Builder. | U. S. Engineer Department. | United States. | United States. | Third district Government fleet. |
| 7. Time to build. | Not completed. | Not completed. | 6 months. | 2 months. |
| 8. Material of hull. | Wood. | Wood. | Steel. | W. ord. |
| 9. Cost of hull. | \$1,317.21. | \$1,317.21. | \$18,720. | \$4,080. |
| 10. Cost of machinery. | \$9,811.94. | \$19,946.11. | \$18,720. | \$12,550. |
| 11. Total cost. | \$11,129.15. | Not completed. | \$12,850. | \$14,630. |
| 12. Present value. | \$1,007. | do. | \$13,611.07. | \$1,000. |
| 13. Length. | 90 feet. | 90 feet. | 120 feet 11 inches. | 120 feet. |
| 14. Beam. | 27 feet. | 40 feet. | 43 feet 2 inches. | 37 feet. |
| 15. Depth. | 5 feet. | 5 feet 1 inch at crown. | 7 feet. | 3 feet. |
| 16. Draft forward. | 5 feet. | 5 feet 6 inches. | 2 feet 6 inches. | 2 feet. |
| 17. Draft aft. | 270. | 40. | 400 tons. | 200. |
| 18. Displacement (long tons). | Cons. | Tilting on strids. | 2 cone, with power tilting device. | Revolving batch mixer. |
| 19. Type of mixing plant. | T. L. Smith Co. | T. L. Smith Co. | T. L. Smith Co., Milwaukee, Wis. | Ransome Concrete Machinery Co. |
| 20. Material. | 1 cubic yard. | Two 14 cubic yards. | 2 mixers, 1 cubic yard each. | No. 61, 1 cubic yard. |
| 21. Size. | About 12 cubic yards. | 60 cubic yards. | 104 cubic yards. | 30 cubic yards. |
| 22. Capacity per hour. | 8½ by 10 inches. | No propelling engine installed. | Each mixer driven by 7 by 7 inch vertical engine. | 8 horsepower. |
| 23. Size of main engine. | 8 feet 6 inches. | 2, 7 feet 6 inches each. | 2 Mississippi River type flue boilers, 24 feet long, 5 to 10 inch flues. | 12 feet. |
| 24. Boiler. | (a) Height. | 2, 5 feet 6 inches each. | 44 inches. | 54 inches. |
| | (b) Diameter. | 2, 910 square feet each. | 1,024 square feet. | 984 square feet. |
| | (c) Heating surface. | 2, 23 square feet each. | 33 square feet. | 18.9 square feet. |
| | (d) Working pressure. | 2, 125 pounds each. | 100 pounds. | 100 pounds. |
| 25. Derrick. | (a) Dimensions of mast. | No derrick installed; use tower and chutes. | 2 "A" frames, 18 inches square latticed legs, 59 feet 3 inches high. | 14 by 14 inches. |
| | (b) Dimensions of boom. | do. | Two 18 inches by 7 feet 10 inches by 123 feet long. | 12 by 12 inches, 60 feet long. |
| 26. Bucket. | (a) Type. | Tilting dump, Insley Manufacturing Co., roller hoist bucket. | 2 Lakewood straight slide, self-dumping. | Hayward, Class E. |
| | (b) Capacity. | 1½ cubic yards. | 1 cubic yard each. | 1 cubic yard. |

TABLE XXII.—Concrete-mixing plant, Dec. 31, 1916—Continued.

| 1. Name..... | No. 17, Hudson River. | No. 65, Mixer Boat, U. S. E. D. Wheeling. | No. 1202. | No. 1609. |
|---|---|---|--|---|
| 27. Hoisting engine: | | | | |
| (a) Type..... | Double cylinder, double drum. | Horizontal 2 cylinder. | 2 double-cylinder, double-friction reversing. | Double engine. |
| (b) Make..... | Lidgerwood. | Lidgerwood. | Stroudsburg. | National. |
| (c) Number of drums..... | 2. | 2. | 84 by 10 inches. | 84 by 10 inches. |
| (d) Dimensions of cylinders..... | 84 by 10 inches. | 84 by 12 inches. | None. | Double engine. |
| 28. Swinging engine: | | | | |
| (a) Type..... | Double cylinder, double drum. | None: Which engine, viz, horizontal 2-cylinder. | | National. |
| (b) Make..... | Lidgerwood. | Lidgerwood Manufacturing Co. | | 4 by 6 inches. |
| (c) Number of drums..... | 2. | 2 which heads. | | 40 cubic yards. |
| (d) Dimensions of mixing hopper..... | 8 by 6 inches. | 4 by 10 inches. | | 700 gallons. |
| 29. Dimensions of water tank..... | 30 gallons. | 40 cubic feet. | | |
| 30. Dimensions of water tank..... | 30 gallons. | Water meter; no tank used. | | |
| 31. Average number of batches: | | | | |
| (a) Per hour..... | 6. | 44. | (1). | 20. |
| (b) Per day..... | 48. | 202. | | 200. |
| 32. Cubic yards of concrete per batch..... | 1. | 1. | | 1. |
| 33. Total number of cubic yards mixed during year..... | 1,392. | 6,073. | | 2,108. |
| 34. Number of days worked..... | 85. | 31. | Laid up all year and receiving additions. | 35. |
| 35. Total cost of operations during year (all charges)..... | \$1,075.88. | \$2,904.13. | | \$1,350.89. |
| 36. Total cost of repairs..... | \$472.10. | \$651.36. | | |
| 37. Cost per cubic yard..... | \$0.64. | \$0.39. | \$14,726. ¹ | \$0.92. |
| 38. Number of men in crew..... | 15. | 13, including foreman and watchman. | 12. | 12. |
| | Remarks. | Remarks. | Remarks. | Remarks. |
| | 1 Employed also as derrick boat. (Gross cost of operation is not a measure of cost of concrete per cubic yard and estimated cost is therefore shown.) | This boat was put in operation before the housing was built. In addition to the above the boat is equipped with the following: (a) 1 steel inside hoist tower with 12-foot removable section; maximum height, deck to top of above, 106 feet. (b) 4 steel stiff legs horizontal; (c) 1 double-trium boom as | Marine leg elevator machinery, etc., to date. The material handling derrick has been removed and a marine leg bucket elevator is being installed. 1 Includes cost of steel portion. 1 "A" frames for concrete conveying booms. 1 Hauling engines for pulling concrete buckets in and out on booms. | Completed November, 1916. Used to place 175,600 square feet of concrete paving. |

⁴ Each mixer and boom unit has capacity of 30 batches of 1 cubic yard.
⁵ Includes cost of steel pontoon addition to hull, \$7,890.

ranged for length of 163 feet, 180 feet, and 200 feet. This boom supports one 14-inch U-shaped Lakewood chute. There is also provided one 55-foot trussed Lakewood chute, and 1 telescopic chute for use at end of boom. This boom is supported at its approximate center in an inclined position by the A frame through a 6-part 1-inch wire line. **This line is attached to 1 drum on the hoisting engine and passes through an automatic locking device at deck level to provide against accidental fall of boom.** The inclination of the boom may be changed from 1 on 2½ to 1 on 4, as desired.

(d) 1 steel A frame with 14-foot removable section for the support of above boom; maximum length overall, 98 feet. The "A" frame is held at an angle of about 45° with the horizontal by two 2½-inch steel-wire cables permanently attached to rear of hull.

(e) 2 sand bins with a capacity of 570 cubic feet each.

(f) 2 gravel bins with a capacity of 1,000 cubic feet each.

(g) 1 coal bin, located between the boilers, with a capacity of 60 tons.

(h) 1 vertical 8-horsepower engine direct connected to each Smith mixer.

(i) 1 100-horsepower Otis feed-water heater.

(j) 1 Dean Bros. horizontal duplex feed-water pump; size, 5½ by 14 by 5.

(k) 1 Worthington horizontal duplex ser. ice pump; size, 9 by 5½ by 10. This pump is equipped with a relief valve for continuous operation.

(l) 5 steam siphons to keep water out of hull.

TABLE XXII.—Concrete-mixing plant, Dec. 31, 1916—Continued.

| 1. Name..... | No. 072. | No. 083. | No. 082. |
|-----------------------------------|----------------------------------|--|---|
| 2. District..... | Third, Mississippi River. | Third, Mississippi River. | Third, Mississippi River. |
| 3. Where operated..... | On Mississippi River. | On Mississippi River. | On Mississippi River. |
| 4. Where built..... | Vicksburg, Miss. | Vicksburg, Miss. | Vicksburg, Miss. |
| 5. When built..... | 1916. | 1916. | 1916. |
| 6. Builder..... | Third district Government fleet. | Third district fleet. | Third district Government fleet. |
| 7. Time to build..... | 2 months. | 2 months. | 2 months. |
| 8. Material of hull..... | Wood. | Wood. | Wood. |
| 9. Cost of hull..... | \$4,000. | \$4,200 (built in 1908). | \$4,200 (built in 1908). |
| 10. Cost of machinery..... | \$1,302.46. | \$1,222.80. | \$1,222.80. |
| 11. Total cost..... | \$11,000. | \$6,750. | \$6,750. |
| 12. Present value..... | \$7,000. | \$4,500. | \$4,500. |
| 13. Length..... | 120 feet. | 120 feet. | 120 feet. |
| 14. Beam..... | 30 feet. | 30 feet. | 30 feet. |
| 15. Depth..... | 9 feet. | 9 feet. | 9 feet. |
| 16. Draft forward..... | 2 feet 6 inches. | 1 foot 9 inches. | 1 foot 9 inches. |
| 17. Draft aft..... | 200. | 150. | 150. |
| 18. Displacement (long tons)..... | Revolving batch mixer. | Revolving batch mixer. | Revolving batch mixer. |
| 19. Type of mixing plant..... | Footle Concrete Machinery Co. | Footle Concrete Machinery Co. | Footle Concrete Machinery Co. |
| 20. Motor..... | No. 400, 14 cubic yards. | No. 6. | No. 6. |
| 21. Size..... | 30 cubic yards. | 20 cubic yards. | 20 cubic yards. |
| 22. Capacity per hour..... | 15 horsepower. | 74 by 84 inches. | 74 by 84 inches. |
| 23. Size of main engine..... | 10 feet. | 60 inches. | 60 inches. |
| 24. Beller..... | 48 inches. | 30 inches. | 30 inches. |
| (a) Height..... | 54 square feet. | 120 square feet. | 120 square feet. |
| (b) Diameter..... | 12.6 square feet. | 6 square feet. | 6 square feet. |
| (c) Heat air surface..... | 100 pounds. | 100 pounds. | 100 pounds. |
| (d) Ratio surface..... | | | |
| (e) Working pressure..... | | | |
| 25. Derrick: | 14 by 14 inches. | Derrick on separate barge ¹ . | Derrick on separate barge. ¹ |
| (a) Dimensions of mast..... | 12 by 12 inches, 60 feet. | | |
| (b) Dimensions of boom..... | | | |
| 26. Bucket: | Haase. | Stuebner bottom dump. | Stuebner bottom dump. |
| (a) Capacity..... | 14 cubic yards. | 4 yard. | 4 yard. |
| (b) Type..... | | | |
| 27. Hauling engine: | Double engine. | On separate barge ¹ . | On separate barge. ¹ |
| (a) Type..... | Clyde Iron Works. | | |
| (b) Make..... | 3. | | |
| (c) Number of drums..... | 84 by 10 inches. | | |
| (d) Dimensions of cylinders..... | | | |
| 28. Sawing engine: | Double engine. | On separate barge ¹ . | On separate barge. ¹ |
| (a) Type..... | Clyde Iron Works. | | |
| (b) Make..... | | | |
| (c) Number of drums..... | | | |
| (d) Dimensions of cylinders..... | 64 by 8 inches. | | |

| | | | |
|---|---|--|--|
| 30. Dimensions of water tank..... | 40 cubic yards..... | 30 cubic yards each..... | |
| 31. Average number of batches:
(a) Per hour..... | 700 gallons..... | 20 gallons..... | |
| (b) Per day..... | 30..... | 30 when working..... | |
| 32. Cubic yards of concrete per batch..... | 300..... | 100..... | |
| 33. Total number of cubic yards mixed during year..... | 14..... | 18 cubic feet..... | |
| 34. Number of days worked..... | 3,111..... | 5,915..... | |
| 35. Total cost of operations during year (all charges)..... | 48..... | 81..... | |
| 36. Total cost of repairs..... | \$2,210.70..... | \$4,194.83..... | |
| 37. Cost per cubic yard..... | \$0.71..... | \$0.71..... | |
| 38. Number of men in crew..... | 12..... | 18..... | |
| | Remarks.
Completed November, 1916. Used to manufacture 336,000 square feet of concrete mats for use on Vicksburg Harbor revetment. | Remarks.
1 Mixer barge served by separate derrick No. 1503, which also places mixed concrete on upper bank.
25 hoppers.
3 Included with cost of derrick No. 1503. | Remarks.
1 Mixer barge served by separate derrick No. 1504, which also places mixed concrete on upper bank.
25 hoppers.
3 Included with cost of derrick No. 1504. |

TABLE XXIII.

CONTRACT DREDGING BY HYDRAULIC DREDGES.

4699

TABLE XXIII.—Contract dredging by hydraulic dredges during the calendar year ending Dec. 31, 1916.

| 1. District..... | | Baltimore, Md. | | Charleston, S. C. | | Galveston. | |
|---|--|-------------------------------------|--------------------------------|-----------------------------|--|---|---|
| 2. Name of dredge..... | Deposits..... | Elk and Little Elk Rivers, Md. | Elk and Little Elk Rivers, Md. | Swann River, N. C. | Matagorda..... | No. 10. Port Bolivar Channel, Tex. | 18 feet or 22 feet before, 25 feet after dredging. |
| 3. Location of dredging..... | Broad Creek, Md. | 7 feet..... | 7 feet..... | 12 feet..... | Turtle Bayou, Tex..... | 2 feet or 3 feet before, 5 feet after dredging. | Bowers Southern Dredging Co., Galveston, Tex. |
| 4. Average depth of water..... | 6 feet..... | Maryland Dredging & Contracting Co. | Hillsboro Dredging Co. | July 9, 1915..... | Jno. Jacobson, Texas City, Tex. | Open market; agreement dated Feb. 21, 1916, Office Ord. 5019. | Open market; agreement dated Feb. 21, 1916, Office Ord. 5019. |
| 5. Name of contractor..... | Sanford & Brooks Co. | July 5, 1916..... | July 5, 1916..... | 100 per cent..... | Poster, circular letter and agreement 958. | 100 per cent (completed)..... | 100 per cent (completed). |
| 6. Date of award of contract..... | Aug. 13, 1914..... | 100 per cent..... | Completed..... | Completed May 12, 1916..... | Completed Feb. 20, 1916..... | Completed Mar. 31, 1916..... | Completed Mar. 31, 1916. |
| 7. Percentage of completion..... | Completed..... | Completed..... | Completed..... | Completed May 12, 1916..... | Completed Feb. 20, 1916..... | Completed Mar. 31, 1916..... | Completed Mar. 31, 1916. |
| 8. Probable date of completion of contract..... | Completed..... | Completed..... | Completed..... | Completed May 12, 1916..... | Completed Feb. 20, 1916..... | Completed Mar. 31, 1916..... | Completed Mar. 31, 1916. |
| 9. Total amount of contract..... | \$19,888.72..... | \$4,476.60..... | \$4,476.60..... | \$43,372.92..... | \$4,000 for complete job..... | \$8,550.38..... | \$8,550.38. |
| 10. Cost per cubic yard..... | 7.9 cents..... | 27 cents..... | 27 cents..... | 13.7 cents..... | \$4,000 for complete job..... | \$8,550.38..... | \$8,550.38. |
| 11. Total number of yards to be removed under this contract..... | 251,756..... | 16,580..... | 16,580..... | 341,981 cubic yards..... | \$4,000 for complete job..... | \$8,550.38..... | \$8,550.38. |
| 12. Total number of cubic yards removed during the calendar year..... | 104,000..... | 16,580..... | 16,580..... | 177,816 cubic yards..... | \$4,000 for complete job..... | \$8,550.38..... | \$8,550.38. |
| 13. Amount paid to contractor during calendar year..... | \$6,795.15..... | \$4,476.60..... | \$4,476.60..... | \$29,154.62..... | \$4,000 for complete job..... | \$8,550.38..... | \$8,550.38. |
| 14. Linear feet of bulkheads constructed during year..... | 500 feet..... | 500 feet..... | 500 feet..... | None..... | \$4,000 for complete job..... | \$8,550.38..... | \$8,550.38. |
| 15. Average length of pipe line..... | 12 inches..... | 12 inches..... | 12 inches..... | None..... | \$4,000 for complete job..... | \$8,550.38..... | \$8,550.38. |
| 16. Diameter of pipe line..... | 9,303..... | 8,290..... | 8,290..... | None..... | \$4,000 for complete job..... | \$8,550.38..... | \$8,550.38. |
| 17. Average number of avargs pumped per month..... | Sand, clay, mud and stumps. | Sand and mud. | Sand and mud. | None..... | \$4,000 for complete job..... | \$8,550.38..... | \$8,550.38. |
| 18. Character of material..... | Dredge, coal and water tender, pipe-line, and gas-line power boat. | Sand and mud. | Sand and mud. | None..... | \$4,000 for complete job..... | \$8,550.38..... | \$8,550.38. |
| 19. Brief description of dredge and attendant plant..... | Dredge, coal and water tender, pipe-line, and gas-line power boat. | Sand and mud. | Sand and mud. | None..... | \$4,000 for complete job..... | \$8,550.38..... | \$8,550.38. |

| | | | |
|--|---|---|---|
| <p><i>Remarks.</i></p> <p>1 The contract was completed in December, 1916, and the contractor will be paid for work done during that month, including retained percentages, in January, 1917.</p> | <p><i>Remarks.</i></p> <p>Contract completed May 12, 1916.
There was dredged 134,296 cubic yards at 13.7 cents, \$18,793.23; and 41,840 cubic yards overdepth, at half price, 6.85 cents, \$2,846.85; for the removal of logs and stumps, \$2,738.11, and \$118 for boats furnished to inspectors and others on duty in connection with the work. Stationary 12-inch hydraulic dredge. Wooden hull, belt drive to pump. Gasoline launch 38 by 14.3 feet; net tonnage 8, used as tender.</p> | <p><i>Remarks.</i></p> <p>Work done under poster, circular letter and agreement No. 488.
Work started Feb. 9, 1916.
Work completed Feb. 26, 1916.</p> | <p><i>Remarks.</i></p> <p>Work done under open-market agreement, office order No. 5619.
Work started Mar. 12, 1916.
Work completed Mar. 31, 1916.</p> |
|--|---|---|---|

TABLE XXIII.—Contract dredging by hydraulic dredges during the calendar year ending Dec. 31, 1916—Continued.

| 1. District | Galveston. | Honolulu, Hawaii. | Jacksonville, Fla. |
|---|---|--|---|
| 2. Name of dredge | Norman H. Davis, No. 10; No. 6, Houston. | Dillingham | Atlantic. |
| 3. Location of dredging | Texas City Channel, Tex. | Honolulu, Hawaii | Biscayne Bay, Fla. |
| 4. Average depth of water. | 20-23 feet before, 30 feet after dredging. | 5 feet to 37 feet. | 6 feet to 10 feet. |
| 5. Name of contractor | Bowers Southern Dredging Co., Galveston, Tex. | Hawaiian Dredging Co. (Ltd.). | Bowers Southern Dredging Co. |
| 6. Date of award of contract. | Dec. 13, 1913. | Mar. 17, 1915. | Oct. 14, 1916. |
| 7. Percentage of completion. | 100 per cent (completed). | 100 per cent. | Inappreciable. |
| 8. Probable date of completion of contract. | May 12, 1916. | Completed Apr. 26, 1916. | July 10, 1917. |
| 9. Total amount of contract. | \$740,604.90. | \$61,235.03. | \$165,124.56. |
| 10. Cost per cubic yard | 124 cents, section 1; 84 cents, section 2. | 17.8 cents. | Rock, \$0.68; sand, \$0.20. |
| 11. Total number of yards to be removed under this contract. | 6,197,079. | 344,017. | 325,285 (approximate). |
| 12. Total number of cubic yards removed during the calendar year. | 1,405,108. | 158,585. | 17,246. |
| 13. Amount paid to contractor during calendar year. | \$131,724.41. | \$23,463.37. | \$3,560.16. |
| 14. Linear feet of bulkhead constructed during year. | None. | None. | None. |
| 15. Average length of pipe line | 1,800 feet. | 5,000 feet. | 480 feet. |
| 16. Diameter of pipe line. | 20 inches to 22 inches. | 18 inches, pontoon; 20 inches, shore. | 12 inches. |
| 17. Average number of yards pumped per month. | 319,344 cubic yards. | 39,000. | 17,246. |
| 18. Character of material. | Clay, sand, and mud. | Disintegrated coral and sand. | 23 inches suction, 22 inches discharge. |
| 19. Brief description of dredge and attendant plant. | | 20-inch suction, 18-inch discharge; 1,000 horsepower oil burner; 58-inch runner. | 22,502 cubic yards. |
| | | See Remarks. | Rock and sand. |
| | | | (1). |
| | | | (1). |

| Remarks. | Remarks. | Remarks. | Remarks. |
|---|---------------------|---|---|
| Dredge Norman H. Davis, 20-inch hydraulic pipe-line dredge; dredge No. 10, 20-inch hydraulic pipe-line dredge; dredge No. 6, 20-inch hydraulic pipe-line dredge; dredge Houston, 22-inch hydraulic pipe-line dredge. Contract completed May 12, 1916. | Contract completed. | Includes \$18.25 for board Government engineer, \$3.20 railroad fare, \$4.75 for boatman's hire, and \$3.53 for lumber for ranges.
Not working for a month.
Wooden hull 58 feet by 16 feet by 4 feet; 25 feet draft; wooden ladder 30 feet long; 8-inch centrifugal pump operated by 60-horse-power Fairbanks-Morse oil engine. | 1 Wood hull, barge type, 100 feet by 26 feet by 8 feet, draft 12 feet, with quarters and sails; 12-horsepower spiral pump; belt driven by 125-horsepower engine; cutter is revolving spiral, operated through gear by engine on ladder. Boiler 14 feet by 12 feet, Scotch marine.
1 St. Johns River, original material to 30 feet depth, 97.8 cents per cubic yard, 30 to 31 feet depth, 88.9 cents per cubic yard; filled material, 12 cents per cubic yard. Haul boro, 12 to 20 feet depth, 50 cents per cubic yard; 21 to 26 feet depth, 24 to 26 cents per cubic yard.
Over depth dredging and filled material not included.
Molded steel hull 180 feet by 30.2 feet by 13.2 feet triple-creased, 1,100-horsepower vertical engine, 25-inch pump bedder, 40 feet tank; 100-horsepower self-propelling. One 75-horsepower gasoline tender, 1 fuel barge, 1 water barge, 1 blacksmith barge. |

TABLE XXIII.—Contract dredging by hydraulic dredges during the calendar year ending Dec 31, 1916—Continued.

| 1. District..... | Jacksonville, Fla. | Los Angeles, Cal. | First New York. | Second New York. |
|---|--|-------------------------------------|---|--|
| 2. Name of dredge..... | San Diego..... | Oakland..... | Massachusetts..... | None..... |
| 3. Location of dredging..... | St. Johns River; St. Lucie Inlet, Fla. | Los Angeles Inner Harbor, Cal. | Hudson River at Troy, N. Y. | Great South Bay (Patchogue River), N. Y. |
| 4. Average depth of water..... | (¹)..... | 23 feet..... | 9 feet at lowest low water..... | ± 4 feet..... |
| 5. Name of contractor..... | Standard American Dredging Co. | San Francisco Bridge Co. | Co. | Tuttle & Raynor. |
| 6. Date of award of contract..... | St. Johns River, Sept. 7, 1915; St. Lucie Inlet, Feb. 24, 1916. | June 22, 1916..... | Oct. 20, 1913..... | Apr. 29, 1916. |
| 7. Percentage of completion..... | St. Johns River, 90 per cent; St. Lucie Inlet, 16 per cent. | 100 per cent..... | 89.4 per cent..... | 65 per cent..... |
| 8. Probable date of completion of contract..... | St. Johns River; St. Lucie Inlet indefinite. ³ | Completed Nov. 21, 1916..... | Aug. 31, 1917..... | Jan. 15, 1917. |
| 9. Total amount of contract..... | St. Johns River, \$235,000; St. Lucie Inlet, \$60,000. | \$37,955.36..... | \$1,028,871.75..... | \$17,920. ¹ |
| 10. Cost per cubic yard..... | St. Johns River, \$3.973 rock, \$0.12 sand; St. Lucie Inlet, \$0.84 rock; \$0.20 sand. | \$3.0534..... | Soft material, \$7.43 and \$1,409.1; rock, \$2.40 and \$2.90. | 17 cents..... |
| 11. Total number of yards to be removed under this contract..... | St. Johns River, 185,000 cubic yards; St. Lucie Inlet, 229,070 cubic yards. ² | 579,689..... | Rock, 163,500; soft, 1,500 (original estimate). | 52,072. |
| 12. Total number of cubic yards removed during the calendar year..... | St. Johns River, 167,488 cubic yards; St. Lucie Inlet, 69,197 cubic yards. | 579,689..... | 23,858 rock, 6'6,092.5 soft (total contract). | 58,002. |
| 13. Amount paid to contractor during calendar year..... | St. Johns River, \$34,079.65; St. Lucie Inlet, \$15,270.09. | \$37,955.36..... | \$283,417.28 (total contract) .. | \$12,055.89. |
| 14. Linear feet of bulkheads constructed during year..... | None..... | None..... | 7,500..... | None. |
| 15. Average length of pipe line..... | 1,400 feet..... | 5,000 feet..... | 1,500..... | 500 feet. |
| 16. Diameter of pipe line..... | 22 inches..... | 27 inches..... | 27 in.-inches..... | 12 inches. |
| 17. Average number of cubic yards pumped per month..... | 23,927..... | 259,580..... | 63,000 cubic yards..... | 17,503. |
| 18. Character of material..... | Rock and sand..... | River silt..... | Sand, gravel, cobblestone, and broken rock. | Sand, gravel, and mud. |
| 19. Brief description of dredge and attendant plant..... | (¹)..... | 22-in-h hydraulic pipe-line dredge. | Wooden hull, 40 by 135 feet; case cutter, 760-horse-power engine. | Length, 97 feet; beam, 28 feet; draft, 4.5 feet. |

Remarks.
 1 St. Johns River, 25 feet before dredging, 30 feet after dredging. St. Lucie Inlet, 6 to 10 feet before dredging.
 2 Work at St. Lucie Inlet suspended for indefinite time on account of weather conditions and to provide more suitable plant.
 3 Over depth dredging and filled material not included.
 4 Wooden hull, 140 feet by 40 feet by 12 feet; drafts forward 8 feet aft 7 feet.
 Dredging pump, 24-inch suction, 22-inch discharge.
 Pumping engine, triple expansion, 1,280 horsepower.
 The pumping engine also operates the cutter by means of a chain belt and universal couplings through a parallel shaft.
 Two gasoline tow-boats, fuel barge, water barge, work barge.

Remarks.
 This plant was used in re-handling material dredged by other plant as well as in channel dredging. Approximately 227,000 cubic yards of material were rehandled by this plant at an average rate of 37,000 cubic yards per month. In channel dredging 227,960 cubic yards per soft material were removed at an average rate per month of 43,500 cubic yards. Contract price \$71,491, amount paid to contractor \$38,258.44.
 Under Hudson River Contract No. 3, 52,172.4 cubic yards of rock at \$2.40 per cubic yard, 37,731.8 cubic yards of rock at \$2.91 per cubic yard, 386,222.9 cubic yards of soft material at \$1.43 per cubic yard, and 1,034,138.6 cubic yards of soft material at \$1.691 per cubic yard, at a total contract value of \$373,477.11 have been removed to date.
 There remains to be removed under this contract approximately 15,000 cubic yards of rock and 170,000 cubic yards of soft material. Amount available for expenditure Dec. 31, 1916, \$832,718.14.
 Attendant plant: 5 tug-boats, 2 coal scows, and 13 dump scows. Dipper dredge No. 52, bucket dredges Nos. 43 and 47, drill boats Nos. 4 and 9, and chisel machine No. 6, were also engaged on this contract.

Remarks.
 Engine, McIntosh & Seymour, low-pressure, one-cylinder, 37-horsepower. Gasoline tug, 35 by 7 feet, with 40-horsepower, 4-cylinder, inboard Lamb engine. Coal boat and water boat.
 1 This contract coupled with one for work at Great South Bay (Patchogue River), N. Y.

Remarks.
 Engine, McIntosh & Seymour, low-pressure, one-cylinder, 37-horsepower. Gasoline tug, 35 by 7 feet, with 40-horsepower, 4-cylinder, inboard Lamb engine. Coal boat and water boat.
 1 This contract coupled with one for work at Browns Creek, N. Y.

TABLE XXIII.—Contract dredging by hydraulic dredges during the calendar year ending Dec. 31, 1916—Continued.

| Second New York. | | New York, Third. | |
|---|---|--|---|
| 1. District..... | | | |
| 2. Name of dredge..... | No. 12..... | Cape May..... | Pittsburgh..... |
| 3. Location of dredging..... | Huntington Harbor, N. Y..... | Newark Bay and Passaic River from deep water in Newark Bay to Plank Food bridge..... | Arthur Kill, N. Y. and N. J. from the vicinity of Baltimore & Ohio bridge to Cartaret..... |
| 4. Average depth of water..... | 6.5 feet..... | 21 feet before dredging; 26 feet after dredging, mean low water..... | 2 feet before dredging; 25 feet after dredging, mean low water..... |
| 5. Name of contractor..... | P. Sanford Ross (Inc.)..... | L. T. Gaylord..... | L. T. Gaylord..... |
| 6. Date of award of contract..... | Aug. 14, 1915..... | Mar. 27, 1916..... | Dec. 29, 1914..... |
| 7. Percentage of completion..... | 100..... | 79.9..... | 100..... |
| 8. Probable date of completion of contract..... | Feb. 2, 1916; operations finally suspended..... | To be completed by Oct. 13, 1917..... | Completed Sept. 30, 1916, by decision of comptroller..... |
| 9. Total amount of contract..... | \$6,000..... | \$119,700..... | \$280,000..... |
| 10. Cost per cubic yard..... | 20.5 cents..... | 12.3 cents per cubic yard, scow measurement..... | 18.2 cents per cubic yard, place measurement..... |
| 11. Total number of yards to be removed under this contract..... | 17,409..... | 2,250,000 cubic yards, scow measurement..... | 1,428,571 cubic yards, place measurement; actually removed, 1,569,391 cubic yards..... |
| 12. Total number of cubic yards removed during the calendar year..... | 5,007..... | 719,055 cubic yards under contract; 144,325 cubic yards by this dredge..... | 578,981 cubic yards under this contract; can not give cubic yards removed by this dredge as more than 1 dredge worked on the same area..... |
| 13. Amount paid to contractor during calendar year..... | \$1,952.33..... | \$82,954.36..... | \$138,943.20..... |
| 14. Lines of bulkheads constructed during year..... | None by contractor..... | No record kept..... | No record kept..... |
| 15. Average length of pipe line..... | 1,800 feet..... | 500-3,000 feet..... | 1,350 feet..... |
| 16. Diameter of pipe line..... | 12 inches suction, 12 inches discharging..... | 20 inches..... | 22 inches..... |
| 17. Average number of cubic yards pumped per month..... | 5,800 in 30 days..... | 92,180 cubic yards by this dredge..... | See No. 12 above..... |

| | | | | | |
|--|---|--|--|---|--|
| 18. Character of material... | Sand, gravel, and mud.....
(3)..... | Mud, sand, clay, gravel, and boulders.....
(1)..... | Mud, sand, and clay.....
(1)..... | Mud, sand, gravel, clay, and red shale.....
(1)..... | Mud, sand, clay, gravel, and shale rock.....
(1)..... |
| 19. Brief description of dredge and attendant plant. | <i>Remarks.</i>

1 Coupled in contract with work at Hempstead Harbor, N. Y. \$6,000 was the amount of the contract in so far as Huntington Harbor was involved.

Length, 88 feet; beam, 32.4 feet; draft, 4.8 feet; engine, 330 horsepower, 2 cylinders 24 and 12 inches diameter each, 12 inch stroke; 1 launch, 2 deck scows. | <i>Remarks.</i>

1 Hydraulic dredge.—Hull, 138 by 42 feet; draft, 6 feet. Engine, 14 by 23 by 40 inches; 20 inch stroke; diameter of intake and discharge, 20 inches centrifugal pump. Attended by a gas-line tug, coal and water boat, pipe lines, pontoons, etc. | <i>Remarks.</i>

1 Hydraulic dredge.—Hull, 140 by 32 feet; draft, 7 feet. Main engine, 14 by 33 by 24 inches; intake diameter, 19 inches; discharge, 20 inches; centrifugal pump; diameter receiver, 48 inches; draft, 14 inches. Attended by several gasoline tugs, launches, coal and water boats, pipe lines, pontoons, etc. The hydraulic dredges C. D. No. 2 and No. 3, Seely No. 2 and No. 6 were also working on the contract during the period.

1 remaining to be removed to complete contract, 180,945 cubic yards, scow. Amount available for expenditure Dec. 31, 1916, \$64,681.20. | <i>Remarks.</i>

1 Hydraulic dredge.—Hull, 124 feet by 15 feet 6 inches; draft, about 9 feet; diameter of pump, 30 inches; pipe line, 30 inches; 3 cylinders, 17 by 23 by 18 inches; 3-inch stroke; boiler, 1,460 horse-power. Attended by several gasoline tugs, coal and water boats, pipe lines, pontoons, etc. The hydraulic dredges Geo. W. Catt and Washington worked on this contract part of calendar year. | <i>Remarks.</i>

1 Hydraulic dredge, 130 by 35 feet; draft, 7 feet 6 inches. Engine, 15 by 23 by 46 inches, 18 inch stroke; intake, 23 inches diameter; discharge, 22 inches diameter; centrifugal pump; diameter, 18 inches; horsepower, 580. Attended by several gasoline tugs and launches, coal and water boats, pipe lines, pontoons, etc. The hydraulic dredges Geo. W. Catt and Pittsburgh also worked on the contract during part of year. |

TABLE XXIII.—Contract dredging by hydraulic dredges during the calendar year ending Dec. 31, 1916—Continued.

| | | New York, Third. | | | |
|---|--|--|---|---|--|
| 1. District..... | | Cape May. | Washington. | Mohawk. | |
| 2. Name of dredge..... | | Shrewsbury River, N. J..... | Newark Bay and Passaic River | Passaic River, N. J., between | |
| 3. Location of dredging..... | | | 2-3-m deep water in Newark Bay | Pennsylvania R. R. freight | |
| 4. Average depth of water..... | | 0 to about 6 feet dredged to 8 feet | to Plank Road bridge. | bridge and Jackson Street. | |
| | | and about 20 feet mean low | 13 to 21 feet dredged to 21 feet | 13 to 16 feet, dredged to 20 feet | |
| | | water. | mean low water. | at mean low water. | |
| 5. Name of contractor..... | | Atlantic Gulf & Pacific Co..... | L. T. Gaylord..... | John A. Feely..... | |
| 6. Date of award of contract..... | | Original contract May 17, 1916; | Mar. 27, 1916..... | Dec. 22, 1914..... | |
| | | supplemental contract July | | | |
| | | 26, 1916. | | | |
| 7. Percentage of completion..... | | 100. | 79.9 | 100. | |
| 8. Probable date of completion of contract..... | | Work under the two contracts | To be completed by Oct. 13, | Last work done on contract | |
| | | completed Aug. 25, 1916. | 1917. | July 27, 1916. Contract terminated by a supplemental contract dated Aug. 30, approved Sept. 12, 1916. | |
| 9. Total amount of contract..... | | \$34,980. | \$119,700. | \$130,000.06. | |
| 10. Cost per cubic yard..... | | 11½ cents per cubic yard, place measurement. | 12.3 cents per cubic yard, scow measurement. | 19½ cents per cubic yard, place measurement. | |
| 11. Total number of yards to be removed under this contract..... | | () | 900,000 cubic yards, scow measurement. | 679,739 cubic yards, place measurement; removed 684,958 cubic yards. | |
| 12. Total number of cubic yards removed during the calendar year..... | | | 719,035 cubic yards under contract; 401,593 cubic yards by this dredge. | 189,465 cubic yards under contract; 56,019 cubic yards by this dredge. | |
| 13. Amount paid to contractor during calendar year..... | | \$35,141.26. | \$53,954.36. | \$47,654.38. | |
| 14. Linear feet of bulkheads constructed during year..... | | None. | No record kept. | No record kept. | |
| 15. Average length of pipe line..... | | 500 to 2,000 feet. | 500 to 2,000 feet. | 500 to 1,000 feet. | |
| 16. Diameter of pipe line..... | | 20 inches. | 22 inches. | 20 inches. | |
| 17. Average number of yards pumped per month..... | | About 112,000 cubic yards per month. | 120,477 cubic yards by this dredge. | 24,000 cubic yards by this dredge. | |
| 18. Character of material..... | | Sand. | Mud, sand, and clay. | Mud, sand, gravel, and clay. | |
| 19. Brief description of dredge and attendant plant..... | | () | () | () | |

Remarks.

¹ Hydraulic dredge.—Hull, 177 by 40 feet; draft, 8 feet. Engine, 15 by 30 by 48 inches; 20-inch stroke; intake and discharge, 27 inches in diameter; centrifugal pump, 1,000 horsepower. The hydraulic dredges Washington and Pittsburgh also worked during part of the calendar year. Attended by several gasoline launches and tugs, coal and water boats, pipe lines, pontoons, etc.

Remarks.

¹ 305,577 cubic yards, place measurement; 254,000 cubic yards under original contract, and 51,577 cubic yards under supplemental contract. This amount was exclusive of 5,079 cubic yards deducted for excessive slopes. This work was done in part for maintenance of Shrewsbury River and in part for the clearing of South Channel of Shrewsbury River and the building of an embankment for the Sandy Hook Railroad (Ordnance Department). The total amount of material placed in the embankment and dam was 272,905 cubic yards. The total number of yards excavated for the maintenance of the river was 44,000 cubic yards; of this 11,328 cubic yards were placed in the embankment.

² Hydraulic dredge.—Hull, 140 by 37 feet; draft, 7½ feet. Main engine, 17½ by 30½ by 24 inches; intake diameter, 19 inches; discharge, 20 inches; centrifugal pump, diameter receiver, 66 inches; width, 14 inches. Attended by 2 gasoline launches, coal and water boats, pipe lines, pontoons, etc.

Remarks.

¹ Hydraulic dredge.—Hull, 130 by 35 feet; draft, 7 feet 5 inches. Engine, 15 by 28 by 46 inches; 18-inch stroke; intake diameter, 23 inches; discharge, 22 inches; pump centrifugal, diameter receiver, 18 inches; width, 18 inches; horsepower, 550. Attended by several gasoline tugs and launches, coal and water boats, pipe lines, pontoons, etc. The hydraulic dredge Cape May No. 3, and Seely No. 2 and No. 6 were also working on this contract during this period. Remaining to be removed to complete contract, 180,945 cubic yards, scow: amount available for expenditures Dec. 31, 1916, \$64,981.29.

Remarks.

¹ Hydraulic dredge.—Hull, 84 by 25 feet; 20-inch turbine pump. Cables attended by coal scow, derrick scow, launch, house-boat, pontoons, pipe, etc. The dipper dredge Columbia and hydraulic dredge A also worked on this contract. Contract completed.

| Remarks. | Remarks. | Remarks. |
|---|--|---|
| <p>¹ Hydraulic dredge A.—Hull, 100 by 30 feet; draft, 8 feet; cylinder, 16 by 18 inches. Attended by pontoons, pipeline 1 pipe stow, 1 water cow, 1 coal scow, 1 vibro, gasoline launch, etc. Digger dredge Comaba, and hydraulic dredge Monawk also working on same contract. Contract completed.</p> | <p>(19) Hydraulic pipe-line dredge, radial feed; hull, 128 feet long, 40 feet 8 inches beam, and 18 feet depth. Morris centrifugal pump, volute type, with 20 inch suction and discharge; line, 500 feet long; 8 1/2 inch pipe, 2,000 feet long; 1 gas. line (air), and 2 deck barges of about 200 tons capacity, each. Total cost includes \$17,149.08 paid for time lost in removing obstructions encountered in dredging. Includes \$11,867.76 paid for time lost in removing obstructions encountered in dredging, including payments made for removing logs, snags, and other obstructions; the work done during the year under this contract cost 16.5 cents per cubic yard.</p> | <p>Contract completed. Contract removed a total of 64,861 cubic yards on this contract, of which 23,788 cubic yards were excess over depth, and 41,073 cubic yards were paid for by city of Baltimore and private parties. Contract price was 27.94 cents per cubic yard. The material was soft mud.</p> <p>¹ Hydraulic dredge.—Hull, 38 by 100 feet; 12 feet depth of hold; 45-horsepower motor run by electric power from transmission line; one 18-inch centrifugal pump, 1,000 feet floating pipe line, 1 gasoline tug, 1 derrick scow, 1 pile driver, 1,500 feet shore pipe line, 1,500 feet shore pipe line, 1 house boat to accommodate 40 men.</p> |

TABLE XXIII.—Contract dredging by hydraulic dredges during the calendar year ending Dec. 31, 1916—Continued.

| 1. District..... | First, San Francisco, Cal. | | Third, San Francisco, Cal. | Savannah, Ga. |
|--|------------------------------|---|---|---|
| 2. Name of dredge..... | John McMullen..... | John McMullen..... | Wilmington..... | No. 5..... |
| 3. Location of dredging..... | Oakland Harbor, Cal..... | Redwood Creek, Cal..... | Stockton (channel and San Joaquin River at mouth of Stockton Channel..... | Brunswick Harbor..... |
| 4. Average depth of water..... | 25 feet..... | 9 feet..... | 8 feet before dredging; 10 feet after..... | 14 to 18 feet before dredging..... |
| 5. Name of contractor..... | San Francisco Bridge Co..... | San Francisco Bridge Co..... | Standard American Dredging Co..... | J. W. Fitzgerald..... |
| 6. Date of award of contract..... | Oct. 2, 1915..... | May 22, 1916..... | July 25, 1916..... | Nov. 30, 1915..... |
| 7. Period of completion..... | 100..... | 100..... | 100..... | Completed Mar. 11, 1916..... |
| 8. Probable date of completion of contract..... | Completed Apr. 1, 1916..... | Work completed June 4, 1916..... | Completed Nov. 15, 1916..... | Completed..... |
| 9. Total amount of contract..... | \$60,707.21..... | \$4,135.47..... | \$9,448.22..... | \$4,275.73..... |
| 10. Cost per cubic yard..... | 11 cents..... | 8 cents..... | 18.4 cents..... | 121 cents..... |
| 11. Total number of yards to be removed under this contract..... | 615,068..... | 63,819..... | 51,349..... | 39,678..... |
| 12. Total number of cubic yards removed during the calendar year..... | 492,978..... | 63,819..... | 51,349..... | 37,144..... |
| 13. Amount paid to contractor during calendar year..... | \$5,743.03..... | \$4,135.47..... | \$9,448.22..... | \$4,080.33..... |
| 14. Linear feet of bulkheads constructed during year..... | None..... | None..... | None..... | None..... |
| 15. Average length of pipe line..... | 2,500 feet..... | 3,000 feet..... | 1,900 feet..... | 600 feet..... |
| 16. Diameter of pipe line..... | 27 inches..... | 22 inches..... | 15 inches..... | 10 inches..... |
| 17. Average number of yards pumped per month..... | 123,244 cubic yards..... | 275,000..... | 45,000..... | 14,428..... |
| 18. Character of material..... | Clay, gravel, and sand..... | Soft mud..... | Silt or clay, sand, some adobe or hard pan..... | Sand, shell, and mud..... |
| 19. Brief description of dredge and attendant plant..... | (1)..... | (1)..... | Electrically operated suction dredge, 500-horsepower motor on pump, 100-horsepower on cutter..... | 10-inch hydraulic pipe-line dredge..... |
| Remarks..... | | Remarks..... | Remarks..... | Remarks..... |
| Contract completed. The contract price per cubic yard was 9.87 cents, a total of 615,068 cubic yards were removed under this contract. The material was about 40 per cent silt mud and about 40 per cent hard material. Hydraulic dredge.—Hull, 35 by 145 feet; 12 feet depth of hold; | | Contract completed. The contract price was 6.18 cents per cubic yard. A total of 66,303 cubic yards was removed on this job, of which only 43,819 cubic yards was paid for by us. The remainder was paid for by local interests for the fill it made. The material was silt | Gasoline boat Wink tender, 130 horsepower, 30 feet length, draft 6 feet.
Dredge, 30 by 80 by 7 feet, draft 5 feet; 15 pontoons, 24 by 8 feet; 600-ft. of pontoon line; 2 landing barges; 1 floating transformer house; 1 small derrick barge. 3,500 feet shore line. | Contract consisted of deepening channel in Academy Creek, Brunswick Harbor, to a depth of 20 feet at mean low water, with a width of cut 8,000 feet with a width of 75 feet. Material removed to a depth not more than 2 feet below required depth paid for at half contract price. |

| | | | |
|--|---|------------------------------------|--|
| <p>900 horsepower Norberg cross compound engine, driven by steam, 22-inch centrifugal pump, water-tube boiler, derrick scow and 2 anchor tugs, 1 steam tug and 2 auxiliary tugs, 1 oil barge, 1 water barge, 1 house-boat to accommodate 40 men, 1,400 feet floating pipeline, 1 pile-driver outfit.</p> | <p>mud. Total contract value was \$4,133.47. Hydraulic dredge.—Hull, 35 by 143 feet; 12 feet depth of hold; 900 h. p. power Norberg cross compound engine, driven by steam; one 22-inch centrifugal pump, water-tube boiler, 1 derrick scow and 2 auxiliary tugs, 1 oil barge, 1 water barge, 1 house-boat to accommodate 40 men, 1,571 feet floating pipeline, 1 pile-driver outfit.</p> | <p>The contract was completed.</p> | <p>28,100 cubic yards removed to full depth; 11.5% cubic yards removed to 2 feet over depth.</p> |
|--|---|------------------------------------|--|

TABLE XXIII.—Contract dredging by hydraulic dredges during the calendar year ending Dec. 31, 1916—Continued.

| 1. District..... | Washington, D. C. | | Wilmington, Del. | |
|--|--|---|--|---|
| | Potomac,
Anacostia River. | Black Diamond
Tuckerton creek, N. J. | No. 5,
Inland waterway between Re-
hoboth and Delaware Bays,
Del. | The Richards Dredging Co. No. 5,
Inland waterway between Re-
hoboth and Delaware Bays,
Del. |
| 2. Name of bridge..... | 22 feet. | 6 feet. | 6 feet. | 6 feet. |
| 3. Location of dredging..... | Maryland Dredging & (contract-
ing. | Hill Dredging Co..... | The Richards Dredging Co..... | Southern Dredging Co. |
| 4. Average depth of water..... | Jan. 3, 1916. | Aug. 3, 1915. | Aug. 22, 1916. | Dec. 8, 1914. |
| 5. Name of contractor..... | Was completed Jan. 5, 1917. | Completed Feb. 24, 1916. | Completed Nov. 10, 1916. | Completed Aug. 15, 1916. |
| 6. Date of award of contract..... | \$44,000. | \$10,461.97. | \$7,473.97. | \$30,012. |
| 7. Percentage of completion..... | 54 cents. | 193 cents, place measurement. | 244 cents, place measurement. | 134 cents, place measurement. |
| 8. Probable date of completion of con-
tract..... | 970,793. | 32,972. | 30,506. | 215,908. |
| 9. Total amount of contract..... | 970,793. | 47,448. | 30,506. | 169,375. |
| 10. Cost per cubic yard..... | \$51,493.48. | \$10,461.97. | \$7,473.97. | \$24,917.39. |
| 11. Total number of cubic yards removed
during the calendar year..... | 4,900 feet, earthen embankments. | None. | None. | None. |
| 12. Total number of cubic yards removed
during the year..... | 1,800 feet. | 400 feet. | 1,000 feet. | 1,500 feet. |
| 13. Linear feet of bulkheads constructed
during year..... | 15 inches. | 12 inches. | 18 inches. | 18 inches. |
| 14. Average length of pipe line..... | 20,000. | 26,360. | 8,900. | 22,580. |
| 15. Diameter of pipe line..... | Mud and sand. | Mud and shells. | Sand, clay, and mud. | Mud, sand, clay, and gravel. |
| 16. Quantity of material..... | See remarks. | See remarks. | See remarks. | See remarks. |
| 17. Brief description of dredge and at-
tendant plant..... | Remarks.
Dredge has wooden hull, 90.6
by 32 ft. by 8.3 feet; draft for-
ward, 6 feet; aft, 5.8 feet; Helme
water, 6 feet; 250-horsepower
boiler; grate surface, 6,551 square
feet; compound condensing, 250-
horsepower engine; suction, 15
inches; discharge, 15 inches; ac-
cessory plant, 44 pontoons, 1
coal scow, 1 gasoline launch, 3
row boats, 1 hand derrick scow. | Remarks.
1 length, 76 feet; breadth, 22
feet; 8 inches; depth, 6 feet; draft,
34 feet; 12-inch pump with 60-
inch runner; 200 revolutions per
minute; suction and discharge,
12 inches; boiler, 165 horsepower;
7 pontoons, 2 gasoline launches,
1 coal and water scow. | Remarks.
1 Hull, 90 by 32 by 9 feet;
draft, 54 feet; engine, vertical
compound, 15 by 18 inches;
revolutions per minute, 180;
pump, 15 inches; fans, diameter,
6 feet; 6 inches, directly con-
nected; coal consumption, 4
ton per hour. | Remarks.
A Browning drag-line scraper
was also employed on this con-
tract prior to calendar year 1916.
1 Hull, 90 by 32 by 9 feet; draft,
54 feet; engine, vertical com-
pound, 15 by 18 inches; 180 revo-
lutions per minute; pump, 15
inches; fans, 6 feet 6 inches, di-
rectly connected; coal consump-
tion, 4 ton per hour. |

TABLE XXIV.

CONTRACT DREDGING BY DIPPER DREDGES.

4715

TABLE XXIV.—Contract dredging by dipper dredges during the calendar year ending Dec. 31, 1916.

| District..... | Boston, Mass. | | Buffalo, N. Y. | |
|--|--|--|--|---|
| 1. Location of dredging.... | Chelsea Creek (lower), Mass. | Lake Erie entrance and Black Rock Canal, Buffalo, N. Y. | Lake Erie entrance and Black Rock Canal, Buffalo, N. Y. | Niagara River, Niagara Falls, N. Y. |
| 2. Average depth of water. | 16.8 feet..... | 21.5 to 23 (feet M. L. L. + 572.8 feet M. T. at New York.) | 21.5 to 23 (feet M. L. L. + 572.8 feet M. T. at New York.) | 23 and 25 (feet M. L. L. + 572.8 feet A. T. at New York.) |
| 3. Name of contractor..... | Morris & Cummings Dredging Co., Bristol | H. S. Kerbaugh (Inc.)..... | H. S. Kerbaugh (Inc.)..... | Arthur E. Breymann..... |
| 4. Name of dredge..... | Bristol..... | Pocantico..... | Pocantico..... | No. 3..... |
| 5. Date of award of contract. | Feb. 26, 1915..... | May 31, 1916..... | May 31, 1916..... | Apr. 22, 1915..... |
| 6. Percentage of completion. | 100..... | 99 per cent..... | 99 per cent..... | Completed..... |
| 7. Probable date of completion of contract. | Apr. 12, 1916..... | May 31, 1917..... | May 31, 1917..... | Oct. 18, 1916..... |
| 8. Total amount of contract. | \$28,707.83..... | \$23,030..... | \$23,030..... | \$38,850..... |
| 9. Cost per cubic yard.... | \$0.126..... | 24¢ cents..... | 24¢ cents..... | 13¢ cents..... |
| 10. Total number of cubic yards to be removed under this contract. | 227,840..... | 94,000..... | 94,000..... | 264,355..... |
| 11. Total number of cubic yards removed during the calendar year. | 34,546..... | 51,994 (by this dredge)..... | 46,487 (by this dredge)..... | 53,977..... |
| 12. Amount paid to contractor during the calendar year. | \$6,372.89..... | \$10,976.13..... | \$9,016.43..... | \$1,237.44..... |
| 13. Average number of cubic yards removed per month. | 18,912..... | 31,000..... | 14,000..... | 11,795..... |
| 14. Character of material.... | Clay, mud, sand, and small bowlders. | Mud, silt, and loose rock. | Mud, silt, and loose rock. | Earth, 5,430 scow measure; bedrock, 2,375 place measure. |
| 15. Average distance from place of work to dump. | 10 miles..... | 6½ miles..... | 6½ miles..... | Clay and bedrock, limestone. 5 miles. |
| 16. Size of dipper and make. | 5 cubic yards; manufactured by contractor. | 4 cubic yards..... | 4½ cubic yards..... | 5 cubic yards; not known. |
| 17. Brief description of dredge and attendant plant. | See Remarks..... | See Remarks..... | See Remarks..... | See below. |

| Remarks. | Remarks. | Remarks. | Remarks. |
|---|--|---|---|
| Dredge 86 feet long, 35 feet breadth, 8 feet draft; main engine, 14 by 24; independent swiveling engines, spud engines, etc. Steam pressure, 150 pounds; dredge attended by tugs for towing scows. No work remains to be done under this contract. No drill boats were used in connection with this work. (Contract value of work done during calendar year was \$4,166.82. | Dredge Pocantico, steel hull, 95 feet by 38 feet by 8 feet 6 inches; main engine, Featherstone double, 12 by 16 inches, swiveling engine; Featherstone double, 8 by 12 inches; 2 bow spuds, each operated by Featherstone double engines, 7 by 12 inches; 1 stern spud operated by Superior Iron Works double engine, 6 by 8 inches; boiler, Scotch dry back, 128 3-inch flues; electric lighted. Tug Sachem, dump scows B-1, steel, 550 cubic yards capacity; B-2, steel, 550 cubic yards capacity. | Dredge Pocantico, wood hull, 96 feet 5 inches by 35 feet by 9 feet; Allis-Chalmers main engine, double, 12 by 12 inches; Allis-Chalmers swiveling engine, double, 7 1/2 by 8 inches; 2 bow spuds operated by main engine; 1 stern spud operated by main engine; Ames locomotive-type boiler, 78 inches by 19 feet 3 inches. Tug Bodur, dump scows B-1, steel, 550 cubic yards; B-2, steel, 550 cubic yards. | The amount excavated exceeded the estimate by 34,386 cubic yards. |
| | | | Remarks. |
| | | | Dredge Hercules, wood hull, 110 by 40 by 12 feet; Bucyrus main engine, double, 16 by 18 inches; swiveling engine, double; 1 stern spud engine, double; 35 by 35 inches; tubular marine boiler. Dredge Gladiator, wood hull, 110 by 38 by 12 feet; Bucyrus main engine, double, 16 by 18 inches; swiveling engine, double; bow spuds operated by main engine; stern spud engine, double, spud, 35 by 35 inches; tubular marine boiler. T. Smith, drill boats Destroyer and Explorer. Dump scows No. 11, 480 cubic yards; No. 18, 480 cubic yards; No. 35, 490 cubic yards; number of cubic yards of material still to be removed, earth, 10,000 scow measure; rock, 1,000 place measure. |

TABLE XXIV.—Contract dredging by dipper dredges during the calendar year ending Dec. 31, 1916—Continued.

| District..... | Buffalo, N. Y. | Cleveland, Ohio. | Detroit, Mich. |
|--|--|--|--|
| 1. Location of dredging..... | West side entrance channel, Dunkirk, N. Y. | Cleveland Harbor, Ohio, east and west basins. | Lake St. Clair. |
| 2. Average depth of water..... | 18 feet M. L. L. 572.8 feet A. T. | 20 feet..... | 19.5 feet before dredging, 21½ feet after. |
| 3. Name of contractor..... | Oliver E. Dunbar, Detroit, Mich. | Great Lakes Dredge & Dock Co. | Great Lakes Dredge & Dock Co. |
| 4. Name of dredge..... | Tipperary Boy..... | Pan American..... | No. 9..... |
| 5. Date of award of contract..... | Sept. 15, 1916..... | Dec. 9, 1915..... | Apr. 6, 1916..... |
| 6. Percentage of completion..... | 8 per cent..... | 100..... | 100 per cent..... |
| 7. Probable date of completion of contract..... | Aug. 15, 1918..... | Completed..... | Dec. 12, 1916..... |
| 8. Total amount of contract..... | \$60,258..... | \$51,712.10..... | \$92,994.36..... |
| 9. Cost per cubic yard..... | Earth, 48 cents; bedrock, \$1.31..... | 7.5 cents per cubic yard, place measurement..... | 12 cents..... |
| 10. Total number of cubic yards to be removed under this contract..... | Earth, 7,000 place measurement; bedrock, 35,000 place measurement..... | 686,503 place measurement..... | 774,983..... |
| 11. Total number of cubic yards removed during the calendar year..... | 8,603..... | do..... | 774,983..... |
| 12. Amount paid to contractor during the calendar year..... | \$3,716.50..... | \$51,712.10..... | \$92,994.36..... |
| 13. Average number of cubic yards removed per month..... | 8,000 place measurement..... | 108,000..... | 96,000..... |
| 14. Character of material..... | Earth and loose rock..... | Mud and sand..... | Clay and sand..... |
| 15. Average distance from work to dump..... | 2½ miles..... | 1.3 miles..... | ¾ mile..... |
| 16. Size of dipper and make..... | 3 cubic yards..... | 10 cubic yards (make unknown)..... | 8 cubic yards..... |
| 17. Brief description of dredge and attendant plant..... | See below..... | See remarks..... | 1 dredge, 2 scows, and 1 tug. |
| | | | Worked less than month. |
| | | | Soft silt. |
| | | | 2½ miles. |
| | | | 8 cubic yards. |
| | | | 1 dredge, 2 scows, and 1 tug. |

| Remarks. | Remarks. | Remarks. | Remarks. |
|---|--|---|---|
| Dredge Tipperary. Box steel hull, 100 by 32 by 4 feet; main engine, double, 12 by 14 inches, made by the Toledo Foundry & Machine Co.; swinging engine, double; 2 bow spuds operated by main engine; 1 stern spud engine, double. Scotch tabular marine boiler. | Dredge Peconic, wood hull, 96.5 by 36 by 9 feet; Allis-Chalmers main engine, double, 12 by 12 inches; Allis-Chalmers swinging engine, double, 7½ by 8 inches; 2 bow spuds operated by main engine, 1 stern spud operated by main engine; Ames locomotive-type boiler, 78 inches by 19 feet 3 inches. | Pan American, wooden hull, 42½ by 136 feet; 1 tug, 3 steel scows, 708, 760, and 760 cubic yards capacity. | Contract let and work completed during calendar year. |
| Tug Shaughran, 3 dump scows; reciprocating, 600 cubic yards; protective pole, 365 cubic yards; No. 9-625, cubic yards. | Tug Rodia, dump scows, B-1, steel, 550 cubic yards; B-2, steel, 550 cubic yards. | | Contract let and work completed during calendar year. |

TABLE XXIV.—Contract dredging by dipper dredges during the calendar year ending Dec. 31, 1916—Continued.

| District..... | Detroit, Mich. | Duluth, Minn. | Grand Rapids, Mich. | Newport, R. I. |
|--|--|--|---|---|
| 1. Location of dredging.... | Tallrace, U. S. power plant, Mich.
St. Marys Falls Canal,
Co. | Ontonagon, Mich..... | Manistee Harbor, Mich..... | New Bedford and Fairhaven Harbors, Mass. |
| 2. Average depth of water. | 2 to 10 feet. | 12.5 feet. | 21 feet. | 15 to 23 feet. |
| 3. Name of contractor..... | Great Lakes Dredge & Dock Co. | Zenith Dredge Co..... | Grelling Bros. Co..... | Bay State Dredging & Contracting Co. |
| 4. Name of dredge..... | No. 8..... | No. 2..... | Grelling Bros. Dredge No. 3. | No. 5 (of Bay State Dredging & Contracting Co.). |
| 5. Date of award of contract. | July 1, 1915..... | June 19, 1916..... | May 1, 1916..... | Apr. 5, 1916. |
| 6. Percentage of completion. | 80..... | 100..... | 65..... | 100. |
| 7. Probable date of completion of contract. | June, 1917..... | Sept. 8, 1916..... | Some time during calendar year 1917. | Completed Oct. 20, 1916. |
| 8. Total amount of contract. | \$140,922.50..... | \$9,088.71..... | \$9,976..... | \$39,755.55. |
| 9. Cost per cubic yard.... | \$1.25 and \$0.624, class A; \$3.10 and \$1.55, class B. | 25 cents..... | 174 cents..... | Rock \$3.25; sand and mud, 14.9 cents; bowlders, 18. |
| 10. Total number of cubic yards to be removed under this contract. | 15,000, class A; 42,850, class B. | 34,297..... | About 87,000..... | Sand and mud, 164,084; bowlders, 98,681; rock, 4,887.5 (place measurement). |
| 11. Total number of cubic yards removed during the fiscal year. | Casting over; no record..... | 34,297..... | 36,945..... | As stated in answer to No. 10. |
| 12. Amount paid to contractor during the fiscal year. | Nothing for this dredge's work. | \$83,817.05..... | \$6,792.57, excludes retained per cents. | \$39,755.55. |
| 13. Average number of cubic yards removed per month. | None removed..... | 17,000..... | 8,000..... | 20,000 mud, sand, and bowlders; rock, unknown. |
| 14. Character of material.... | Class A, bowlders and hardpan; class B, Potsdam sandstone in situ. Nothing dumped..... | Sand..... | Sand and clay..... | Sand, mud, bowlders, and ledge rock. |
| 15. Average distance from work to dump. | 4-yard soft-dredging dipper, made in Duluth. Ordinary dipper dredge, tug, and scow; locomotive and cars on dike. | 2 mile..... | 2 miles..... | 5 miles. |
| 16. Size of dipper and make. | 4-yard soft-dredging dipper, made in Duluth. | 41, Bucyrus..... | 24 cubic yards; make not known. | 5 cubic yards; designed and built by contractor. |
| 17. Brief description of dredge and attendant plant. | Ordinary dipper dredge, tug, and scow; locomotive and cars on dike. | Wooden hull, dredge attended by tugs. ¹ | 24-cubic yard dipper dredge, 2 dump scows, and 1 tug. | See Remarks. |

| Remarks. | Remarks. | Remarks. | Remarks. |
|---|---|-------------------------|---|
| Employed only 108 hours during the entire year: cleaning up after dredge No. 3, picking up, and casting over on the dike material which had fallen into the cut. No pay material included in this work. | 12,329 cubic yards of material still to be removed at the end of calendar year. All funds available for completion of contract.
Material removed: Class B (Potsdam sandstone in situ) 27,744 cubic yards at \$3.10 per cubic yard. Area, 1,440 feet long by 60 feet wide.
Character of work: Subaqueous rock drilling and excavating in swift-running water.
Drill boat No. 44: Costs included in price of excavation. | 1 Mystic and Robertson. | Number of cubic yards yet to be removed, about 20,000; amount available for expenditure, about \$4,300. |
| | | | Dredge is 96 by 36 by 9 feet; wood hull; 4 spuds; main engine built by Portland Co. and is a 14 by 24 inch double engine; swing- ing engines are 10 by 12 inch double; spud engines are 9 by 9 inch. Boller is a Hedge locomotive type, 17 feet 6 inches long, 7 feet diameter; has General Electric lighting system, 2 feed-water heaters, 1 Blake jet condenser, 2 bilge pumps, feed pump, and surface pump. It is capable of digging hard material when making from 10 to 30 feet of water.
Seagoing tug Augustus for towing and tug Blue Jay dredge tender. Three 600-yard scows.
Drill float belonging to C. W. Johnston and equipped with two Ingersoll-Sargent 33-inch drills capable of drilling to 35 feet.
No material remaining to be removed under contract at end of calendar year. One drill float used; its operating costs are included above. |

TABLE XXIV.—Contract dredging by dipper dredges during the calendar year ending Dec. 31, 1916—Continued.

| District..... | First New York | New York, Third. | | Philadelphia, Pa. |
|---|--|--|--|---|
| 1. Location of dredging.... | Hudson River at Troy, N. Y. | Shrewsbury River, N. J. | Arthur Kill, N. Y. and N. J.,
reach area in the vicinity
of Shodor's Island and
from the Baltimore &
Chesapeake bridge to Buckwheat
Island. | Delaware River (Philadel-
phia Harbor). |
| 2. Average depth of water.... | 9 feet at lowest low water.... | 5 to 6 feet; dredged to 6 to 8
feet at mean low water. | 22.3 feet before dredging;
23.6 feet after dredging;
mean low water. | 25 feet before dredging;
dredged to 35 feet mean low
water. |
| 3. Name of contractor.... | Great Lakes Dredge & Dock
Co. | George F. Kilds. | Eugene Freyman. | Mariand Dredging & Con-
tracting Co., Baltimore-
Md. |
| 4. Name of dredge..... | No. 52..... | Capitol City..... | Toledo..... | Gov. Herrick
June 30, 1915. |
| 5. Date of award of con-
tract. | Oct. 20, 1913..... | May 17, 1916..... | Apr. 5, 1916..... | June 30, 1915. |
| 6. Percentage of comple-
tion. | 99.4 per cent. | 100 per cent. | 56.8 per cent. | 100 per cent. |
| 7. Probable date of com-
pletion of contract. | Aug. 31, 1917..... | Completed June 27, 1916..... | Nov. 24, 1917, date fixed for
completion. | Contract completed Dec. 9,
1916. |
| 8. Total amount of con-
tract. | \$1,028,571.75..... | \$4,600..... | \$79,500..... | \$230,513.99. |
| 9. Cost per cubic yard.... | Soft, \$0.4091 and \$0.43; rock,
\$2.40 and \$2.90.
Rock, 163,500; soft, 1,500,000
(original estimate). | 45 cents per cubic yard, scow
measurement.
10,061 cubic yards. | 463 cents per cubic yard,
place measurement.
160,000..... | 194 cents per cubic yard,
place measurement.
679,739 cubic yards, place
measurement; removed
684,198 cubic yards.
189,465 cubic yards removed
under contract; 20,909 re-
moved by this dredge.
\$47,664.38..... |
| 10. Total number of cubic
yards to be removed
under this contract. | Rock, 20,633.2; soft, 370,186.2
(No. 52). |do..... | 91,088 cubic yards. | 24.9. |
| 11. Total number of cubic
yards removed dur-
ing the calendar year. | \$233,417.29 (total contract).... | \$4,530.20..... | \$40,037.50..... | 925,799 cubic yards (net). ¹ |
| 12. Amount paid to con-
tractor during the
calendar year. | 52,000 (No. 52)..... | About 20,000 cubic yards per
month. | 22,772..... | 226,548 cubic yards (gross). ¹ |
| 13. Average number of
cubic yards removed
per month. | Sand, gravel, cobbles, stones,
and broken rock.
1 to 50 miles..... | Sand and mud..... | Mud, clay, red shale, and
trap rock.
About 26 miles..... | \$140,802.00+. |
| 14. Character of material.... | 5 cubic yards..... | Dipper 24 cubic yards ca-
pacity. | Dipper 15 cubic yards ca-
pacity. | 80,000. |
| 15. Average distance from
work to dump. | | | | Mud, sand, gravel, and clay. |
| 16. Size of dipper and
masts. | | | | 9 miles. |
| | | | | 8, 9, and 10 cubic yards; Bu-
cyrus. |

17. Brief description of dredge and attendant plant.

Wooden hull, 40 by 120 feet.

Remarks.

Under Hudson River contract, No. 3, 52,172 4 cubic yards of rock, at \$2.40 per cubic yard; 30,731 8 cubic yards of rock, at \$2.90 per cubic yard; 386,222 9 cubic yards of soft material, at \$0.43 per cubic yard, and 1,034,136 6 cubic yards of soft material, at \$0.4091 per cubic yard, at a total contract value of \$83,477.11. There remains to be removed under this contract approximately 15,000 cubic yards of rock and 100,000 cubic yards of soft material. Amount available for expenditure Dec. 31, 1916, \$35,719.14.

Hydraulic dredge Massachusetts, bucket dredgers Nos. 43 and 47, drill boats Nos. 4 and 9, and chisel machine No. 6 were also engaged on this contract. The cost of operating the drill boats and rock breaker is included in the contract price. Attendant plant, 5 tugboats, 2 coal scows, and 13 dump scows.

Dipper dredge, wooden hull, 62 feet by 31 inches; draft 5 feet; 4 dump scows, 1 water boat, 1 tugboat.

Remarks.

Contract completed June 27, 1916. Material disposed of by dumping in east channel of Shrewsbury River near site of dam, closing channel constructed in connection with building of embankment for Sandy Hook Railroad.

Dipper dredge, hull 135 feet by 44 feet; draft 16 feet; bucket 15 cubic yards; engine 18 by 24 by 28 inches, 2 tug boats, 6 dump scows, a coal and water boat; 1 hand derrick scow 63 by 30 feet used as sweep for about 2 months.

Remarks.

Contract terminated by a supplemental contract dated Aug. 30, approved Sept. 12, 1916.

Dipper dredge; hull 83 feet by 33 feet, draft 4 feet 6 inches; engine cylinder 18 by 22 inches. This dredge attended by 1 tugboat, 1 coalboat, and several dump scows. The hydraulic dredges Mohawk and A also worked on this contract during the period. Contract is completed.

Remarks.

Includes work done by dredges Kennedy and Severn. 164,183 cubic yards was also removed under this contract by the dredge Kennedy, and 45,500 cubic yards by dredge Severn (reported under "Bucket dredges").

Dipper dredge, assisted by bucket ladder and grapple dredges, 1 rehandling machine, with 1 tug and 3 to 3 scows to each dredge.

TABLE XXIV.—Contract dredging by dipper dredges during the calendar year ending Dec. 31, 1916—Continued.

| District | Philadelphia, Pa. | Seattle, Wash. | Seattle, Wash. |
|--|---|--|--|
| 1. Location of dredging | Delaware River (at Trenton, N. J.) | Salmon Bay, Seattle, Wash. | Salmon Bay, Seattle, Wash. |
| 2. Average depth of water | 2 feet before dredging; dredged to 12 feet mean low water. | 10 feet at extreme low water | 12 feet. |
| 3. Name of contractor | Eugene Breymann, Toledo, Ohio. | The Erickson Construction Co. | Erickson Construction Co. |
| 4. Name of dredge | Newburgh and President | Erickson No. 1 | Erickson No. 1 |
| 5. Date of award of contract | Apr. 21, 1914; supplemental contract dated Apr. 6, 1916. | Mar. 3, 1915 | June 9, 1916. |
| 6. Percentage of completion | 100 | Completed. | Completed. |
| 7. Probable date of completion of contract | Completed Sept. 14, 1916 | Mar. 31, 1916. | Aug. 21, 1916. |
| 8. Total amount of contract | \$161,011.14 | \$54,887.39 | \$12,477.12 |
| 9. Cost per cubic yard | \$0.33 for sand, gravel, clay, etc., and \$21.50 per cubic yard for ledge rock. | 27 cents | 33 cents. |
| 10. Total number of cubic yards to be removed under this contract. | Sand, etc., 357,128; bowlders, 63; ledge rock, 1,174. | 137,638.1 | 40,046. |
| 11. Total number of cubic yards removed during the calendar year. | Sand, etc., 105,321; bowlders, 10; ledge rock, 1,174. | 82,241 | 40,046.1 |
| 12. Amount paid to contractor during the calendar year. | \$31,125.48 | \$26,230.10 | \$12,497.12 |
| 13. Average number of cubic yards removed per month. | 20,000 | 27,414 | 40,000 |
| 14. Character of material | Gravel, clay, bowlders, and ledge rock. | Silt and sand, underfield with hard clay. | Silt and sand, underfield with hard clay. |
| 15. Average distance from work to dump. | 3 miles | 1 mile | 1 mile. |
| 16. Size of dipper and make | (?) | 42 by 48 by 48 inches, Marion, Ohio, patent, June 11, 1903. | 42 by 48 by 48 inches, Marion, Ohio, patent, June 11, 1903. |
| 17. Brief description of dredge and attendant plant. | 2 dredges, 2 tugs, and 2 to 3 scows each dredge. | Two 80-horsepower boilers, oil scow, tug, and two 200-cubic yard barges. | Two 80-horsepower boilers, oil scow, tug, and two 200-cubic yard barges. |
| | <i>Remarks.</i>
Contractor's drill boat No. 1 was used and cost of operation is included in contract price.
1 Due to exhaustion of funds applicable to this contract, it was declared completed on Sept. 14, 1916.
1 Dredge Newburgh, 21 cubic yards (Osrood); dredge President, 5 cubic yards (Marion). | <i>Remarks.</i>
Includes 7,222 cubic yards overdepth at 13½ cents. | <i>Remarks.</i>
Includes 1,045 cubic yards overdepth at 16 cents. |

TABLE XXV.

BUCKET DREDGES BY CONTRACT.

4725

TABLE XXV.—Contract dredging by bucket dredges during the calendar year ending Dec. 31, 1916.

| District.....A..... | | Baltimore, Md. | | | | | | | | | |
|--|---|--|--|--|--|--|--|--|--|--|--|
| 1. Location of dredging... | Patapsco River, Md..... | Chalbourne Harbor, Md..... | La Trappe River, Md..... | Warwick River, Md..... | Choptank River, Md..... | | | | | | |
| 2. Average depth of water. | 37 feet..... | 12 feet..... | 11 feet..... | 10 feet..... | 8 feet..... | | | | | | |
| 3. Name of contractor..... | Maryland Dredging & Contracting Co., Baltimore..... | Maryland Dredging & Contracting Co., Baltimore..... | Maryland Dredging & Contracting Co., Baltimore..... | Maryland Dredging & Contracting Co., Baltimore..... | Maryland Dredging & Contracting Co., Baltimore..... | | | | | | |
| 4. Name of dredge..... | ..... | ..... | ..... | ..... | ..... |  |  |  |  |  |  |
| 5. Date of award of contract..... | June 22, 1916..... | Oct. 1, 1916..... | Oct. 1, 1915..... | Oct. 1, 1915..... | Oct. 1, 1915..... | | | | | | |
| 6. Percentage of completion..... | 100..... | 100..... | 100..... | 100..... | 100..... | | | | | | |
| 7. Probable date of completion of contract..... | Completed..... | Completed..... | Completed..... | Completed..... | Completed..... | | | | | | |
| 8. Total amount of contract..... | \$30,494.72..... | \$1,783.19..... | \$2,242.96..... | \$2,645.23..... | \$3,711.33..... | | | | | | |
| 9. Cost per cubic yard..... | 81 cents..... | 26 1/2 cents..... | 26 1/2 cents..... | 26 1/2 cents..... | 26 1/2 cents..... | | | | | | |
| 10. Total number of cubic yards to be removed under this contract..... | 348,511..... | 6,729..... | 8,464..... | 9,982..... | 14,005..... | | | | | | |
| 11. Total number of cubic yards removed during the calendar year..... | 348,511..... | 6,729..... | 8,464..... | 9,982..... | 14,005..... | | | | | | |
| 12. Amount paid to contractor during the calendar year..... | \$30,494.72..... | \$1,783.19..... | \$2,242.96..... | \$2,645.23..... | \$3,711.33..... | | | | | | |
| 13. Average number of cubic yards removed per month..... | 37,130..... | 20,000..... | 25,000..... | 30,000..... | 40,000..... | | | | | | |
| 14. Character of material..... | Mud..... | Sand, clay, and mud..... | Mud and clay..... | Mud and sand..... | Sand, clay, and mud..... | | | | | | |
| 15. Average distance from work to dump..... | 6 miles..... | 2 miles..... | 4 miles..... | 2 miles..... | Material put ashore..... | | | | | | |
| 16. Size of bucket and make of tractor..... | 6-yard bucket, made by contractor..... | 6-yard bucket, made by contractor..... | 6-yard bucket, made by contractor..... | 6-yard bucket, made by contractor..... | 6-yard bucket, made by contractor..... | | | | | | |
| 17. Brief description of dredge and attendant plant..... | Dredge, coal and water tender, 3 scows, and 2 towboats..... | Dredge, scows, coal and water tender, and towboat..... | Dredge, scows, coal and water tender, and towboat..... | Dredge, scows, coal and water tender, and towboat..... | Dredge, scows, coal and water tender, and towboat..... | | | | | | |

TABLE XXV.—Contract dredging by bucket dredges during the calendar year ending Dec. 31, 1916—Continued.

| District..... | Baltimore, Md. | | Honolulu, Hawaii. | Jacksonville, Fla. | New London, Conn. |
|--|--|--|--|--|---|
| 1. Location of dredging..... | Chester River, Pa..... | Susquehanna, River Md..... | Kahului, Maui, Hawaii..... | Trout Creek Cut, St. Johns River, Fla..... | Harbor of Refuge, Duct Island Harbor, Conn..... |
| 2. Average depth of water..... | 6 feet..... | 15 feet..... | 25 feet..... | 25 feet before, 30.5 after dredging..... | 9 feet..... |
| 3. Name of contractor..... | Maryland Dredging & Contracting Co., Baltimore..... | Dorsey & Miller Co., Dixon..... | Kahului Railroad Co., Improvised barge; no name..... | Home Dredging Co., No. 1..... | J. S. Packard Dredging Co., Deliver..... |
| 4. Name of dredge..... | Baltimore..... | Dixon..... | Aug. 2, 1916..... | Aug. 6, 1916..... | Oct. 5, 1916..... |
| 5. Date of award of contract..... | Oct. 1, 1916..... | July 21, 1916..... | 100..... | 100..... | 6..... |
| 6. Percentage of completion..... | 100..... | 72½..... | 100..... | Completed..... | Nov. 20, 1917..... |
| 7. Probable date of completion of contract..... | Completed..... | Mar. 26, 1917..... | Completed Apr. 28, 1916..... | Completed..... | \$37,000 (estimated)..... |
| 8. Total amount of contract..... | \$3,917.50..... | \$11,375..... | \$15,000..... | \$197,000..... | 7.7 cents..... |
| 9. Cost per cubic yard..... | 29½ cents..... | 16½ cents..... | 30 cents..... | \$1.35 to 30-foot depth; \$0.67½, 30 to 32 foot depth..... | 480,000..... |
| 10. Total number of cubic yards to be removed under this contract..... | 14,783..... | 70,000..... | 50,000 original estimate..... | 172,000 (about)..... | 30,207..... |
| 11. Total number of cubic yards removed during the calendar year..... | 14,783..... | 50,950..... | 29,552..... | 21,850..... | \$2,131.37..... |
| 12. Amount paid to contractor during the calendar year..... | \$3,917.50..... | \$7,232.39 1..... | \$11,730.43..... | \$16,585.42..... | Plant did not work a full month..... |
| 13. Average number of cubic yards removed per month..... | 14,783..... | 10,190..... | 7,500..... | (1)..... | Mud..... |
| 14. Character of material..... | Sand, clay, and mud..... | Sand, mud, and clay..... | Sand and disintegrated coral..... | 70 per cent rock, 30 per cent clay..... | 3 miles..... |
| 15. Average distance from work to dump..... | Put ashore..... | 2½ miles..... | 1 mile..... | ¾ mile..... | 8-yard, clamshell bucket..... |
| 16. Size of bucket and mate..... | 8-yard bucket, made by contractor..... | 8-yard bucket, made by contractor..... | 2-yard Hayward (orange pool)..... | ¾ cubic yards, Forbes patent..... | 1 dredge, 3 tugs, 1 lighter, 1 water boat, and 4 scows..... |
| 17. Brief description of dredge and attendant plant..... | Dredge, scows, coal and water tender, and towboat..... | Dredge, coal and water tender, 3 scows, and towboat..... | Improvised for work; old machinery temporarily installed on barge..... | (1)..... | |

| | | | |
|--|--|--|--|
| | | | <p><i>Remarks.</i></p> <p>Dredging begun Oct. 16, 1916, and suspended for the winter on Nov. 2, 1916. Estimated amount of material still to be removed under contract, about 450,000 cubic yards; funds available for expenditure, \$67,000.</p> |
| | <p><i>Remarks.</i></p> <p>1 This plant was engaged in cleaning up bowlder rock behind the hydraulic dredge No. 6. No payments were made on the work of this dredge No. 1.</p> <p>2 Wood hull, 30 by 27 feet; mean draft, 4½ feet; Mundy double 12 by 20 inch engine; Scotch boiler; 48-foot boom; 2 dump screws; 1 coal barge; one 75-horsepower gasoline towboat.</p> | | |
| | <p><i>Remarks.</i></p> <p>Contract completed. No drill boats used under this contract.</p> | | |
| <p><i>Remarks.</i></p> <p>1 \$1,027.15 due contractor for work done during December, 1916; 19,060 cubic yards still to be removed under the contract. Amount available for expenditure, \$11,960.72.</p> | | | |

TABLE XXV.—*Contract dredging by bucket dredges during the calendar year ending Dec. 31, 1916—Continued.*

| District..... | New London, Conn. | | | New Orleans, La. | Newport, R. I. |
|--|--|--|------------------------------------|---------------------------------|--|
| 1. Location of dredging.... | Connecticut River below Hartford, Conn. | Bridgeport Harbor, Conn. | Housatonic River, Conn. | Bayou Teche, La. | Providence Harbor, R. I. |
| 2. Average depth of water.... | About 10 feet. | 8 feet. | 6 feet. | 6.8 feet at mean low water. | 30 feet. |
| 3. Name of contractor..... | Hartford & New York Transportation Co. | Maritime Dredging Co. | John P. Randerson. | Southern Dredging Co. | J. S. Packard Dredging Co. |
| 4. Name of dredge..... | Ajax..... | Syracuse..... | Capitol City..... | Pittsburg and Albert G. Thomas. | Delver. |
| 5. Date of award of contract. | Mar. 23, 1916..... | May 24, 1916..... | Sept. 9, 1916..... | June 12, 1915..... | Apr. 17, 1916 (emergency). |
| 6. Percentage of completion. | 100..... | 100..... | 100..... | 97..... | 100. |
| 7. Probable date of completion of contract. | Completed Oct. 14, 1916..... | Completed Sept. 21, 1916..... | Completed Oct. 27, 1916..... | Jan. 16, 1917..... | Completed Apr. 26, 1916. |
| 8. Total amount of contract. | \$12,652.46..... | \$7,301.47..... | \$7,766.45..... | \$31,250..... | \$4,576.02. |
| 9. Cost per cubic yard..... | 14 cents. | 14.5 cents. | 23 cents. | 7.8 cents. | 14.9 cents. |
| 10. Total number of cubic yards to be removed under this contract. | 89,236..... | 53,368..... | 33,640..... | 400,000..... | 36,505. |
| 11. Total number of cubic yards removed during the calendar year. | 89,236..... | 53,368..... | 33,640..... | 359,210 cubic yards..... | 36,505. |
| 12. Amount paid to contractor during the calendar year. | \$12,652.46..... | \$7,301.47..... | \$7,766.45..... | \$23,018.33..... | \$4,576.02. |
| 13. Average number of cubic yards removed per month. | 17,847.2..... | 23,732..... | 26,858..... | 29,934..... | 36,505. |
| 14. Character of material. | Sand. | Mud. | Sand. | Soft mud. | Mud, sand, gravel. |
| 15. Average distance from work to dump. | 1 mile..... | 6 miles..... | 1 mile..... | 16½ miles..... | 16½ miles. |
| 16. Size of bucket and make. | 1.9-cubic yard, Osgood..... | 6-yard clamshell bucket..... | 2-yard scoop..... | 1½-cubic yard, orange peel..... | 7-yard clamshell, contractor's design. |
| 17. Brief description of dredge and attendant plant. | 1 scoop dredge, 1 tug, 2 bottom-dumping scoops, and 1 coal scow. | 1 dredge, 1 tug, 1 coal barge, and 3 scoops. | 1 dredge, 1 towboat, and 3 scoops. | See Remarks..... | Wooden hull, held by quarter lines, bottom-dumping scoops and steam tug. |

| | |
|--|---|
| <p><i>Remarks.</i></p> <p>14.9 cents per cubic yard to 30 feet depth; 28,945 cubic yards, \$4,312.81.
7.45 cents per cubic yard 30 to 32 feet depth; 7,560 cubic yards, \$563.22.
Material: Mud, sand, and gravel.</p> | <p><i>Remarks.</i></p> <p>The dredge Pittsburgh has a barge hull, 32 by 80 by 6 feet, and equipped with McMyer engine and independent swing and 11-cubic yard bucket.</p> <p>The dredge Albert O. Thomas is a gravity swing dredge with a barge hull of 30 by 80 by 6 feet, Griswold engine, 14 cubic yard bucket. Attendant plant consists of quarter boat, gasoline launch, and fuel barge.</p> |
|--|---|

TABLE XXV.—Contract dredging by bucket dredges during the calendar year ending Dec. 31, 1916—Continued.

| District..... | Newport, R. I. | | New York, first. | |
|--|--|--|---|---|
| | Providence River, R. I., below Fields Point.
J. S. Packard Dredging Co. | Providence Harbor, R. I. (long bed).
P. S. Saurd Ross (Inc.) | Hudson River Channel, N. Y.
Coastwise Dredging Co. | Hudson River at Troy, N. Y.
Great Lakes Dredge & Dock Co. |
| 1. Location of dredging.... | Providence River, R. I., below Fields Point. | Providence Harbor, R. I. (long bed). | 26 feet at mean low water. | 9 feet at lowest low water. |
| 2. Average depth of water.... | 30 feet. | 25 feet. | Coastwise Dredging Co. | Great Lakes Dredge & Dock Co. |
| 3. Name of contractor..... | J. S. Packard Dredging Co. | P. S. Saurd Ross (Inc.) | | |
| 4. Name of dredge..... | Delver..... | Delver..... | No. 6..... | No. 43..... |
| 5. Date of award of contract..... | Aug. 12, 1914. | Apr. 26, 1915. | Mar. 23, 1914, and Sept. 10, 1915. | Oct. 20, 1913. |
| 6. Percentage of completion..... | 100. | 100. | 100. | 89.4. |
| 7. Probable date of completion of contract..... | Completed May 3, 1916. | Completed Aug. 7, 1916. | Completed Apr. 6, 1916. | Aug. 31, 1916. |
| 8. Total amount of contract..... | \$244,083.17. | \$83,514.60. | \$140,000—\$250,000, continuing contract. | \$1,028,871.75. |
| 9. Cost per cubic yard..... | 7.98 cents for material; 18 cents per cubic yard for bowlders exceeding 1½ cubic yards each. | Subdivision A, 30 cents; subdivision B, 10½ cents. | 14.3 cents. | Soft, \$0.4091 and \$0.43; rock, \$2.40 and \$2.50. |
| 10. Total number of cubic yards to be removed under this contract..... | 3,655,438 material, scow measurement, and 32,402 cubic yards bowlders. | 478,358, place measurement. | 2,583,198.4. | 163,500 rock, 1,500,000 soft (original estimate). |
| 11. Total number of cubic yards removed during the calendar year..... | 6,986. | 291,510.5, place measurement. | 72,992.4. | 5,235.9, at \$0.4091; 2,243.6, at \$2.40; and 601.2, at \$2.50. |
| 12. Amount paid to contractor during the calendar year..... | \$23,988.22. | \$37,494.24. | \$32,087.91. | \$10,264.13 (this plant). |
| 13. Average number of cubic yards removed per m. nh..... | 105,500. | 87,929. | 22,810. | 1,500. |
| 14. Character of material..... | Mud and sand. | Mud, sand, gravel, some bowlders. | Mud. | Sand, gravel, cobblestones and broken rock. |
| 15. Average distance from work to dump..... | 12½ miles. | 15½ miles. | 35 miles. | 1 to 50 miles. |
| 16. Size of bucket and make of dredge..... | 7-yard clamshell, contractor's design. | 7-yard clamshell, contractor's design. | 3 cubic yard, clamshell. | 2-cubic yard clamshell, 3-cubic yard crane foot. |
| 17. Brief description of dredge and attendant plant..... | Wooden hull, 14 by 4 feet; 1 b. lifter, 14 by 6 feet; 1 direct-current motor, 36, main engine, 10-hp. by 36, main engine, 10-hp. by 36, 1 launch, 7 scows. | Wooden hull, 120 by 14 by 4 feet; 1 b. lifter, 14 by 6 feet; 1 direct-current motor, 36, main engine, 10-hp. by 36, 1 launch, 7 scows. | Wooden hull, 80 by 23.5 by 8.5 feet. | Wooden hull, 50 by 101 feet. |

| Remarks. | Remarks. | Remarks. |
|---|--|---|
| 7.98 cents for material:
3,035.438 cubic yards, \$243,-
823.95.
\$8 for bowlders exceeding
14 cubic yards each; 32.402
cubic yards, \$259.22.
Material: Mud and sand. | Subdivision A: 30 cents
per cubic yard, place meas-
urement, to 25 feet depth,
194,415 cubic yards, \$58,-
324.50; 15 cents per cubic
yard, place measurement, 25
to 27 feet depth, 14,228 cubic
yards, \$2,133.90.
Subdivision B: 10.5 cents
per cubic yard, place meas-
urement, to 25 feet depth,
250,351 cubic yards, \$26,-
286.86; 5.25 cents per cubic
yard, place measurement, 25
to 27 feet depth, 19,366 cubic
yards, \$1,016.72.
Bowlders, exceeding 14
cubic yards each, at \$8 per
cubic yard; 94,078 cubic
yards, \$752.62.
Character of material:
Subdivision A: Mud and
shells overlying compact
sand and bowlders. Subdi-
vision B: Mud and shells. | This plant was used exclu-
sively in removing shoals
Under Hudson River con-
tract No. 3, 52,172.4 cubic
yards of rock, at \$2.40 per cu-
bic yard; 30,731.8 cubic yards
of rock, at \$2.90 per cubic
yard; 386,222.9 cubic yards of
soft material, at \$0.43 per cu-
bic yard, and 1,034,136.6 cubic
yards of soft material, at
\$0.4091 per cubic yard, at a
total contract value of \$893,-
477.11 have been removed to
date.
There remains to be re-
moved under this contract
approximately 15,000 cubic
yards of rock, and 100,000
cubic yards of soft material.
Amount available for ex-
penditure Dec. 31, 1916,
\$392,718.14.
Attendant plant: 5 tug-
boats, 2 coal scows, 13 dump
scows.
Hydraulic dredge Massa-
chusetts, dipper dredge No. 47,
52, bucket dredge No. 47,
drill boats Nos. 4 and 9, and
chisel machine No. 6 were
also engaged on this con-
tract. |

TABLE XXV.—Contract dredging by bucket dredges during the calendar year ending Dec. 31, 1916—Continued.

| District..... | Second New York. | | New York, Thrd. | |
|--|---|--|---|---|
| 1. Location of dredging.... | Gowanus Creek, New York Harbor. | Newark Bay and Passaic River from deep water in the bay to Plank Road Bridge. | Newark Bay and Passaic River, N. J. from deep water in the bay to Plank Road Bridge. | Keyport Harbor, N. J. |
| 2. Average depth of water. | 26 feet..... | 15 to 21 feet, dredged to 21 feet at mean low water. | 15 to 21 feet, dredged to 21 feet at mean low water. | 7 to 8 feet, dredged to about 9 feet at mean low water. |
| 3. Name of contractor..... | Morris & Cummings Dredging Co. | L. T. Gaylord..... | L. T. Gaylord..... | John and Joseph McSpirt. |
| 4. Name of dredge..... | M. & C. No. 5. | C. D. No. 2. | No. 6. | No. 1. |
| 5. Date of award of contract. | Worked started May 8, 1916. | Mar. 27, 1916. | Mar. 27, 1916. | Mar. 14, 1916. |
| 6. Percentage of completion. | 100 per cent..... | 79.9 per cent..... | 79.9 per cent..... | 100 per cent. |
| 7. Probable date of completion of contract. | Completed May 11, 1916. | To be completed by Oct. 13, 1917. | To be completed Oct. 13, 1917. | Contract completed May 10, 1916. |
| 8. Total amount of contract. | \$3,028.78. | \$119,700. | \$119,700. | \$8,400. |
| 9. Cost per cubic yard.... | 28 cents..... | 13.3 cents per cubic yard, scow measurement. | 13.3 cents per cubic yard, scow measurement. | 30 cents per cubic yard. |
| 10. Total number of cubic yards to be removed under this contract. | 10,817 cubic yards..... | 900,000 cubic yards, scow measurement. | 900,000 cubic yards, scow measurement. | 28,000 cubic yards, scow measurement. |
| 11. Total number of cubic yards removed during the calendar year. | do..... | 719,055 cubic yards removed under the contract; 108,970 yards removed by the dredge. | 719,055 cubic yards under contract; 5,540 cubic yards by dredge. | Removed and accepted under contract 30,121 cubic yards. Also removed 5,063 cubic yards deducted for overdepth dredging. |
| 12. Amount paid to contractor during the calendar year. | \$3,028.78. | \$83,954.36. | \$83,954.36. | \$7,616.16. |
| 13. Average number of cubic yards removed per month. | 22,258 cubic yards by this dredge. | 27,870 cubic yards..... | 4,260 cubic yards..... | The amount removed constituted one month's work. |
| 14. Character of material. | Mud and sand..... | Mud, sand, and clay. | Mud, sand, and clay. | Mud and sand. |
| 15. Average distance from dump. | 20 miles..... | About 3 miles..... | About 3 miles..... | About 15 miles. |
| 16. Size of bucket and make. | 15 cubic yards. | Clamshell; 4 cubic yards capacity. | Clamshell; 10 cubic yards capacity. | Clamshell; 5 cubic yards capacity. |
| 17. Brief description of dredge and attendant plant. | Dredge, wood hull, 125 by 40 by 9 feet; scow, tug, etc. | Bucket dredge No. 2; wooden hull, 90 by 36 feet; draft, 7 feet; main engine, two cylinders, 13 by 24 inches; attended by 2 tugs, coal and water boat, and several dump scows, etc. Hy- | Bucket dredge No. 6; wooden hull, 110 by 50 feet; main engine, 24 by 36 inches; attended by 2 tugs, coal and water boats, and several dump scows. Hy- | Bucket dredge; hull, 90 by 33 feet; draft, 6½ feet; attended by 3 dump scows, 1 water boat, 1 coal boat, 1 tug boat, and 1 launch. Contract completed May 10, 1916. |

dredges Washington and Cape May, and bucket dredges C. D. No. 2, Seely No. 3 and No. 6, also working on this contract. This dredge used to dig areas in bridge draws. Remaining to be removed to complete contract, 180,945 cubic yards, snow. Amount available for expenditure Dec. 31, 1916, \$64,981.29.

and Washington, and bucket dredges No. 3, C. D. No. 2, and Seely No. 2, also worked on the contract during the period. This dredge engaged on the lower end of the work in Newark Bay. The number of cubic yards remaining to complete contract, 180,946. Amount available for expenditure Dec. 31, 1916, \$64,981.29.

draulic dredges Cape May and Washington, and bucket dredges No. 3 and No. 6 and Seely No. 2 also working on this contract during the period. This dredge engaged on the lower end of the work in Newark Bay. The number of cubic yards remaining to be removed to complete contract, 180,946. Amount available for expenditure Dec. 31, 1916, \$64,981.29.

TABLE XXV.—Contract dredging by bucket dredges during the calendar year ending Dec. 31, 1916—Continued.

| District..... | Second New York. | New York, Third. | Keyport Harbor, N. J. |
|--|---|---|---|
| 1. Location of dredging.... | Gowanus Creek, New York Harbor. | Newark Bay and Passaic River from deep water in the bay to Plank Road Bridge. | Newark Bay and Passaic River, N. J., from deep water in the bay to Plank Road Bridge. |
| 2. Average depth of water. | 26 feet..... | 15 to 21 feet, dredged to 21 feet, mean low water. | 7 to 8 feet, dredged to about 9 feet, mean low water. |
| 3. Name of contractor..... | Morris & Cummings Dredging Co. | L. T. Gaylord. | L. T. Gaylord. |
| 4. Name of dredge..... | M. & C. No. 5. | No. 6. | No. 1. |
| 5. Date of award of contract. | Worked started May 8, 1916. | Mar. 27, 1916. | Mar. 14, 1916. |
| 6. Percentage of completion. | 100 per cent. | 79.9 per cent. | 100 per cent. |
| 7. Probable date of completion of contract. | Completed May 11, 1916. | To be completed by Oct. 13, 1917. | Contract completed May 10, 1916. |
| 8. Total amount of contract. | \$3,028.76. | \$119,700. | \$8,400. |
| 9. Cost per cubic yard..... | 28 cents. | 13.3 cents per cubic yard, scow measurement. | 30 cents per cubic yard. |
| 10. Total number of cubic yards to be removed under this contract. | 10,817 cubic yards. | 900,000 cubic yards, scow measurement. | 28,000 cubic yards, scow measurement. |
| 11. Total number of cubic yards removed during the calendar year. | do. | 719,055 cubic yards under contract; 57,652 cubic yards by this dredge. | Removed and accepted under contract 30,121 cubic yards. Also removed 3,088 cubic yards deducted for overdepth dredging. |
| 12. Amount paid to contractor during the calendar year. | \$3,028.76. | \$83,954.36. | \$7,616.16. |
| 13. Average number of cubic yards removed per month. | 22,258 cubic yards by this dredge. | 27,570 cubic yards. | The amount removed constituted one month's work. |
| 14. Character of material. | Mud and sand. | Mud, sand, and clay. | Mud and sand. |
| 15. Average distance from water to dump. | 20 miles. | About 2 miles. | About 15 miles. |
| 16. Size of bucket and make. | 15 cubic yards. | Clamshell; 4 cubic yards capacity. | Clamshell; 5 cubic yards capacity. |
| 17. Brief description of dredge and attendant plant. | Dredge; wood hull, 125 by 40 by 8 feet; scow, tug, etc. | Bucket dredge No. 2; wooden hull, 90 by 36 feet; draft, 7 feet; main engine, two cylinders, 18 by 24 inches; attended by 3 tugs, coal and water boat, and several dump scows, etc. Hydraulic dredges Cape May | Bucket dredge; hull, 90 by 33 feet; draft, 6½ feet; attended by 3 dump scows, 1 water boat, 1 coal boat, 1 tug boat, and 1 launch. Contract completed May 10, 1916. |

dredges Washington and Cape May and bucket dredges C, D, No. 2, Seely No. 3 and No. 6, also working on this contract. This dredge used to dig areas in bridge draws. Remaining to be removed to complete contract, 180,945 cubic yards, snow. Amount available for expenditure Dec. 31, 1916, \$64,981.29.

and Washington and bucket dredges No. 3, C.D. No. 2 and Seely No. 2 also worked on the contract during the period. This dredge engaged on the lower end of the work in Newark Bay. The number of cubic yards remaining to complete contract, 180,945. Amount available for expenditure Dec. 31, 1916, \$64,981.29.

draulic dredges Cape May and Washington and bucket dredges No. 3 and No. 6 and Seely No. 2 also working on this contract during the period. This dredge engaged on the lower end of the work in Newark Bay. The number of cubic yards remaining to be removed to complete contract, 180,945. Amount available for expenditure Dec. 31, 1916, \$64,981.29.

TABLE XXV.—Contract dredging by bucket dredges during the calendar year ending Dec. 31, 1916—Continued.

| District..... | New York, Third. | | Philadelphia, Pa. | |
|--|--|---|---|---|
| 1. Location of dredging.... | Newark Bay and Passaic River from deep water in bay to Plank Road Bridge. | Raritan Bay, N. Y. and N. J. | Delaware River (below Philadelphia, Pa.). | Delaware River (below Philadelphia, Pa.). |
| 2. Average depth of water. | 15 to 21 feet, dredged to 21 feet, mean low water. | 19 to 21 feet, dredged to 21 feet, at mean low water. | 25 feet before dredging. Dredged to 35 feet mean low water. | 30 feet before dredging. Dredged to 35 feet mean low water. |
| 3. Name of contractor..... | L. T. Gaylord..... | Morris & Cumings Dredging Co. | Maryland Dredging & Contracting Co., Baltimore, Md. | Maryland Dredging & Contracting Co., Baltimore, Md. |
| 4. Name of dredge..... | Sealey No. 2..... | No. 5..... | Admiral, Atlantic, Baltic, Commodore, Chesapeake, and Severn. | Kennedy. |
| 5. Rate of award of contract. | Mar. 27, 1916..... | Feb. 28, 1916..... | June 30, 1915..... | July 29, 1916. |
| 6. Percentage of completion. | 79.9 per cent..... | 100 per cent..... | 100 per cent..... | 62 per cent. |
| 7. Probable date of completion of contract. | To be completed by Oct. 13, 1917. | Contract completed Sept. 9, 1916. | Contract completed Nov. 10, 1916. | June 1, 1917. |
| 8. Total amount of contract. | \$119,700..... | About \$19,800..... | \$230,513.99..... | \$64,800. |
| 9. Cost per cubic yard..... | 13.3 cents per cubic yard, scow measurement. | 164 cents per cubic yard, scow measurement. | 24.9 cents..... | 16.2 cents. |
| 10. Total number of cubic yards to be removed under this contract. | 900,000 cubic yards, scow measurement. | About 120,000 cubic yards. | 925,759 cubic yards (net)..... | 400,000. |
| 11. Total number of cubic yards removed during the calendar year. | 719,055 cubic yards under contract; 4,776 cubic yards by this dredge. | 124,569 cubic yards..... | Kennedy, 164,183; Severn, 48,596..... | 213,851. |
| 12. Amount paid to contractor during the calendar year. | \$83,064.36..... | \$20,100.67..... | \$140,892.06..... | \$26,340. |
| 13. Average number of cubic yards removed per month. | For this dredge, 10,080 cubic yards per month. | While dredge worked, 88,040 cubic yards, scow measurement. | Kennedy, 50,000; Severn, 32,000. | 50,000. |
| 14. Character of material. | Mud, sand, and clay..... | Mud and sand..... | Mud, sand, gravel, and clay. | Mud, sand, gravel, clay, and cobbles. |
| 15. Average distance from work to dump. | About 2 miles..... | About 16 miles..... | 9 miles..... | 4 miles. |
| 16. Size of bucket and make. | Clamshell bucket; capacity, 5 cubic yards. | Clamshell; 10 cubic yards capacity. | (?)..... | 24 buckets; 21 cubic feet each. |
| 17. Brief description of dredge and attendant plant. | Clamshell dredge, wooden construction, Seely No. 2 wooden hull, 88 by 21 feet, depth 8 feet; 2 main engines, 21 by 18 inches; 2 speed engines, 6 by 8 inches; locomotive boiler, tended by 2 tugboats, 1 | Bucket dredge No. 5, wooden hull, 108 by 42 feet beam, overhang 13 feet forward; draft, 9 feet; main cylinders, 20 by 24 inches; 1 dredge and 2 tugboats, 1 | 1 bucket ladder dredge, 1 clamshell dredge, and 1 dipper dredge used on contract, assisted by 1 re-treating machine and 1 tug, and 2 to 3 scows to each dredge. | Bucket ladder dredge, 1 re-handling machine, with 1 tug and 2 to 3 scows. |

| 120 pounds pressure. The hydraulic dredges Cape May and Washington, and clamshell dredges No. 2, and No. 6 also worked on this contract during the period. They were attended by 2 to 3 tugs, coal and water boats, launches, pontoons, etc. The number of cubic yards remaining to be removed under contract is 180,946. The amount available for expenditure is \$64,981.29. | launch, 1 coal and water boat, 1 stake boat, and several dump scows. Contract was completed Sept. 9, 1916. | <i>Remarks.</i>

¹ Includes work done by dredge Gov. Herrick.
276,548 cubic yards of material was also removed by the dipper dredge Gov. Herrick (reported under "Upper dredges").
² Kennedy, bucket ladder dredge, 34 buckets, 21 cubic feet each; Severn, clamshell, 34 cubic yards contractor's designs. | <i>Remarks.</i> <table><thead><tr><th>1 Re-
moved
by
dredge—</th><th>Cubic
yards.</th><th>Average
per
month,
cubic
yards.</th></tr></thead><tbody><tr><td>Admiral</td><td>1,168,256</td><td>170,000</td></tr><tr><td>Atlantic</td><td>180,402</td><td>90,000</td></tr><tr><td>Baltic...</td><td>808,236</td><td>125,000</td></tr><tr><td>Commo-
dore...</td><td>962,520</td><td>135,000</td></tr><tr><td>Chesa-
peake...</td><td>26,949</td><td>60,000</td></tr><tr><td>Severn...</td><td>789,464</td><td>140,000</td></tr><tr><td>Total</td><td>4,335,827</td><td>.....</td></tr></tbody></table> | 1 Re-
moved
by
dredge— | Cubic
yards. | Average
per
month,
cubic
yards. | Admiral | 1,168,256 | 170,000 | Atlantic | 180,402 | 90,000 | Baltic... | 808,236 | 125,000 | Commo-
dore... | 962,520 | 135,000 | Chesa-
peake... | 26,949 | 60,000 | Severn... | 789,464 | 140,000 | Total | 4,335,827 | | <i>Remarks.</i>

² Admiral, clamshell, 10 cubic yards; contractor's design, Atlantic, clamshell, 4 cubic yards; contractor's design, Baltic clamshell, 54 cubic yards; contractor's design, Commodore clamshell, 10 cubic yards; contractor's design, Chesapeake, clamshell, 4 cubic yards; contractor's design, Severn, clamshell, 34 cubic yards, contractor's design. | <i>Remarks.</i>

Estimated quantity of material remaining to be removed, 130,000 cubic yards.
Amount available for expenditure Jan. 1, 1917, \$38,500. |
|--|--|---|--|---------------------------------|-----------------|---|---------|-----------|---------|----------|---------|--------|-----------|---------|---------|-------------------|---------|---------|--------------------|--------|--------|-----------|---------|---------|-------|-----------|-------|---|---|
| 1 Re-
moved
by
dredge— | Cubic
yards. | Average
per
month,
cubic
yards. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Admiral | 1,168,256 | 170,000 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Atlantic | 180,402 | 90,000 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Baltic... | 808,236 | 125,000 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Commo-
dore... | 962,520 | 135,000 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chesa-
peake... | 26,949 | 60,000 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Severn... | 789,464 | 140,000 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | 4,335,827 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

TABLE XXV.—Contract dredging by bucket dredges during the calendar year ending Dec. 31, 1916—Continued.

| District..... | Portland, Me. | First San Francisco, Cal. | Third San Francisco, Cal. | Third San Francisco, Cal. | Washington, D. C. |
|--|--|---|---|---|--|
| 1. Location of dredging..... | St. Croix River, Me..... | Petaluma Creek, Cal..... | San Joaquin River, Smith Canal and Cut-off "U. C."..... | (1), (2), and (3)..... | Potomac River at Washington, D. C. |
| 2. Average depth of water..... | 3.5 feet to be dredged to 9 feet..... | 64 feet to McNear's Canal, then 41 feet..... | 8 feet before dredging..... | (1) Indeterminate; (2) 4 to 7 feet; (3) 4 feet..... | 4 feet. |
| 3. Name of contractor..... | Eastern Dredging Co..... | American Dredging Co..... | American Dredging Co..... | The Western Co..... | Dorsey & Miller Co. |
| 4. Name of dredge..... | Kennebec..... | Golden Gate..... | Monarch..... | Tule King..... | Daniel |
| 5. Date of award of contract..... | Sept. 7, 1915..... | Nov. 8, 1915..... | July 27, 1916..... | Aug. 4, 1916..... | June 7, 1916 (public notice order). |
| 6. Percentage of completion..... | 100 per cent..... | 100 per cent..... | Indeterminate; contract annulled as reasonable progress not made..... | (1) 62 1/2 per cent; (2) and (3) 100 per cent..... | Completed. |
| 7. Probable date of completion of contract..... | Completed Oct. 26, 1916..... | Jan. 21, 1916..... | do..... | (1) Apr. 4, 1917; (2) and (3) completed..... | 4,530 cubic yards. |
| 8. Total amount of contract..... | \$49,132.79..... | \$2,893.65..... | 52,000 cubic yards, place measurement..... | (1) Indeterminate; (2) \$2,245.03; (3) \$550.53..... | Unit cost, \$6 per hour's work. |
| 9. Cost per cubic yard..... | \$0.5393 per cubic yard, scow measurement..... | 3.67 cents..... | 7 1/2 cents..... | (3)..... | 4,520. |
| 10. Total number of cubic yards to be removed under this contract..... | 91,274 cubic yards, scow measurement..... | 78,940 cubic yards..... | 52,000 cubic yards..... | (1)..... | |
| 11. Total number of cubic yards removed during the calendar year..... | 73,428 (net)..... | 46,940 cubic yards..... | See No. 6 above..... | (1) 359,299; (2) 70,000; (3) 14,100..... | |
| 12. Amount paid to contractor during the calendar year..... | \$40,928.93..... | \$2,893.65..... | None; see No. 6 above..... | (1) \$3,178.92; (2) \$2,245.03; (3) \$550.53..... | \$238. |
| 13. Average number of cubic yards removed per month..... | 12,450 cubic yards, scow measurement..... | 65,000 cubic yards..... | See No. 6 above..... | (1) 102,640; (2) 65,758; (3) operated less than 1 month..... | Work was done between June 6-17, 1916. |
| 14. Character of material..... | Sawmill waste, with gravel and bowlders..... | Mud..... | Sand, adobe, and some peat..... | (1) 30 per cent sand, 70 per cent peat; (2) sand; (3) 65 per cent sand, 35 per cent silt..... | Mud. |
| 15. Average distance from work to dump..... | About 8 miles..... | Material dumped on banks of creek..... | 100 feet..... | (1) On embankment at side of cut; (2) 100 feet; (3) 125 feet..... | Embankment work. |
| 16. Size of bucket and make..... | 2 cubic-yard orange peel, (cut steel)..... | 3 1/2 cubic yards; made by Golden Gate & Miners Iron Works..... | 44 cubic yards, clam shell; Union Iron Works..... | 44 yards, Stockton-Trethaway..... | 14 cubic yards, clam shell. |
| 17. Brief description of dredge and attendant plant..... | Bucket dredge Kennebec Hull's..... | Hull 60 feet by 100 feet; horsepower, 460; boom 242 feet long; bucket, 8 tons weight..... | Hull Monarch, 52 1/2 feet by 120 feet by 12 feet; tender tug Inspector..... | Clamshell dredge 66 feet by 128 feet; 203 feet boom..... | Wood hull 68 feet by 2 1/2 feet by 6 feet. No auxiliary plant. |

TABLE XXV.—*Contract dredging by bucket dredges during the calendar year ending Dec. 31, 1916—Continued.*

| District..... | Washington, D. C. | | | | | |
|--|--|--|--|--|--|------------------------|
| | Anacostia River, D. C. | Potomac River at Washing-
ton, D. C. | Anacostia River..... | Potomac River..... | Anacostia River, D. C. | |
| 1. Location of dredging..... | 4 feet..... | 4 feet..... | 1 foot..... | 4 feet..... | 1 foot..... | Anacostia River, D. C. |
| 2. Average depth of water..... | Dorsey & Miller Co..... | Dorsey & Miller Co..... | 1 E. Smoot..... | 1 E. Smoot..... | Dorsey & Miller Co..... | |
| 3. Name of contractor..... | Daniel..... | Daniel..... | W. A. Smoot, No. 3..... | W. A. Smoot, No. 3..... | Daniel..... | |
| 4. Name of dredge..... | Oct. 18, 1916 (public notice order)..... | June 12, 1916 (public notice order)..... | Oct. 30, 1915 (public notice order)..... | Dec. 8, 1916 (public notice order)..... | Apr. 13 and June 5, 1916 (2 public notice orders)..... | |
| 5. Date of award of contract..... | 34 per cent..... | Completed..... | Completed..... | 30 per cent..... | 80 per cent..... | |
| 6. Percentage of completion..... | Mar. 1, 1917..... | ..... | ..... | Mar. 15, 1917..... | Mar. 30, 1917..... | |
| 7. Probable date of completion of contract..... | 35,000 cubic yards..... | 15,067 cubic yards..... | 25,103 cubic yards..... | 40,000 cubic yards..... | 110,000 cubic yards..... | |
| 8. Total amount of contract..... | 94 cents..... | Unit cost, \$4.15 per hour's work..... | Unit cost, \$5 per hour's work..... | Unit cost, \$4.50 per hour's work..... | Unit cost, \$4.15 per hour's work..... | |
| 9. Cost per cubic yard..... | 11,675 cubic yards..... | 15,067..... | 25,103..... | 40,000 cubic yards..... | 66,966 cubic yards..... | |
| 10. Total number of cubic yards to be removed under this contract..... | 11,675 cubic yards..... | 15,067..... | 17,634..... | 7,579 cubic yards..... | 65,966 cubic yards..... | |
| 11. Total number of cubic yards removed during the calendar year..... | None..... | \$756.34..... | \$1,274.10..... | None..... | \$4,790.58..... | |
| 12. Amount paid to contractor during the calendar year..... | 14,000 cubic yards..... | Work was done between June 12 and July 7, 1916..... | 6,000..... | 10,000 cubic yards..... | 8,000 cubic yards..... | |
| 13. Average number of cubic yards removed per month..... | Mud..... | Mud..... | Mud..... | Mud..... | Mud..... | |
| 14. Character of material..... | 1 mile..... | Embankment work..... | Embankment work..... | Embankment work..... | Embankment work..... | |
| 15. Average distance from work to dump..... | 11 cubic yards clamshell..... | 11 cubic yards clamshell..... | 11 cubic yards clamshell..... | 11 cubic yards clamshell..... | 11 cubic yards clamshell..... | |
| 16. Size of bucket and make..... | Wood hull, 68 feet by 28 feet by 6 feet; no auxiliary plant..... | Wood hull, 68 feet by 28 feet by 8 feet; no auxiliary plant..... | Wood hull, 60.3 feet by 30.2 feet by 5.6 feet; no auxiliary plant..... | Wood hull, 60.5 feet by 30.2 feet by 5.6 feet; no auxiliary plant..... | Wood hull, 68 feet by 28 feet by 6 feet; no auxiliary plant..... | |
| 17. Brief description of dredge and attendant plant..... | yard dump-across..... | ..... | ..... | ..... | ..... |  |

| | | | | |
|---|--|--|---|--|
| <i>Remarks.</i>
Small tug Dalman does towing. Work just above Pennsylvania Avenue Bridge. Dump just below Pennsylvania R. R. bridge. | <i>Remarks.</i>
Work was embanking behind training dike for Virginia Channel. | <i>Remarks.</i>
Work was trenching for riprap foundations and building embankments for hydraulic dredge. Dredge was not constantly employed, but only during such periods as the work required. | <i>Remarks.</i>
Work consisting of building embankments for hydraulic dredges. | <i>Remarks.</i>
Work was trenching for riprap foundations and building embankments for hydraulic dredge. Dredge was not constantly employed, but only during such periods as the work required. |
|---|--|--|---|--|

TABLE XXV.—Contract dredging by bucket dredges during the calendar year ending Dec. 31, 1916—Continued.

| District..... | Wilmington, Del. | | | |
|---|---|--|--|--|
| 1. Location of dredging..... | Raccoon Creek, N. J.
5 feet..... | Smyrna River, Del.
7 feet..... | Smyrna River, Del.
7 feet..... | Murderkill River, Del.
7 feet..... |
| 2. Average depth of water..... | River & Harbor Improvement Co.
Little Devil..... | River & Harbor Improvement Co.
Atlanta..... | River & Harbor Improvement Co.
Atlanta..... | River & Harbor Improvement Co.
Atlanta..... |
| 3. Name of contractor..... | May 22, 1916..... | May 4, 1916..... | May 4, 1916..... | Sept. 18, 1915..... |
| 4. Name of dredge..... | 85 per cent..... | 83 per cent..... | 83 per cent..... | 100 per cent..... |
| 5. Date of award of contract..... | April 15, 1917..... | Mar. 1, 1917..... | Mar. 1, 1917..... | Completed Feb. 26, 1916..... |
| 6. Percentage of completion of contract..... | \$4,260..... | \$16,020..... | \$16,020..... | \$4,383.18..... |
| 7. Probable date of completion of contract..... | 17½ cents, place measurement 24,000..... | 8.9 cents, place measurement 180,000..... | 8.9 cents, place measurement 180,000..... | 13.7 cents, place measurement 34,067..... |
| 8. Total amount of contract..... | 965..... | 57,313..... | 39,944..... | 32,067..... |
| 9. Cost per cubic yard under this contract..... | \$2,260.27..... | \$11,062.51..... | \$11,062.51..... | \$4,383.18..... |
| 10. Total number of cubic yards removed during the calendar year..... | Did not work full month..... | 16,375..... | 17,885..... | 17,180..... |
| 11. Average number of cubic yards removed per month..... | Mud and sand 1,900 feet..... | Mud, sand, and clay..... | Mud, sand and clay..... | Mud, sand, clay and shells..... |
| 12. Character of material..... | 1 yard, orange-peel..... | Material cast over bank alongside..... | Material cast over bank alongside..... | Material cast over bank alongside..... |
| 13. Average distance from work to dump..... | See remarks..... | 24 yards, clamshell..... | 11 yards, clamshell..... | 23 yards, clamshell..... |
| 14. Size of bucket and make..... | See remarks..... | See remarks..... | See remarks..... | See remarks..... |
| 15. Brief description of dredge and attendant plant..... | | | | |

| Remarks. | Remarks. | Remarks. | Remarks. |
|--|--|---|---|
| Hull, 40 by 14 by 4 feet; draft, 2½ feet; engine, Williamson, 6 by 6 inches; boiler vertical; length of banking boom, 36 feet; coal consumption, 3 tons per week; coal scow and gasoline tender. Bucket dredge Atlanta was also used on this contract. | Hull, 83 by 30 by 9 feet; draft, 4½ feet; engine, horizontal, 12 by 16 inches, 150 to 100 revolutions per minute; boiler, Scotch, 90-horsepower; coal consumption, 250 pounds per hour; length of banking boom, 72 feet; coal scow and gasoline launch tender. Estimated quantity of material still to be removed at end of calendar year 1916, about 30,400 cubic yards; amount available for expenditure about \$5,000. Bucket dredges Arizona and Asia were also used on this contract. | Hull, 80 by 24 by 7 feet; draft, 3½ feet; engine, horizontal, 8 by 20 inches, 150 to 100 revolutions per minute; boiler, tubular square leg, 80-horsepower; coal consumption, 200 pounds per hour; length of banking boom, 67 feet; coal scow and gasoline launch tender. Bucket dredges Atlanta and Arizona were also used on this contract. | Hull, 96 by 34 by 10 feet; draft, 6 feet; engine, horizontal, 14 by 18 inches, 100 to 150 revolutions per minute; boiler, square leg marine, 100-horsepower; coal consumption, 400 pounds per hour; length of banking boom, 80 feet; coal scow and gasoline launch tender. Bucket dredges Atlanta and Asia were also used on this contract. |
| Hull, 85 by 30 by 9 feet; draft, 4½ feet; engine, horizontal, 12 by 16 inches, 150 to 100 revolutions per minute; boiler, Scotch, 90-horsepower; coal consumption, 250 pounds per hour; length of banking boom, 72 feet; coal scow and gasoline launch tender. | | | |

TABLE XXV.—Contract dredging by bucket dredges during the calendar year ending Dec. 31, 1916—Continued.

| District..... | Wilmington, Del. | |
|--|---|---|
| 1. Location of dredging..... | Mispillion River, Del. | Salem River, N. J. |
| 2. Average depth of water..... | 6 feet. | 8 feet. |
| 3. Name of contractor..... | Eller & Harbor Improvement Co. | Eller & Harbor Improvement Co. |
| 4. Name of dredge..... | Atlanta. | Atlanta. |
| 5. Date of award of contract..... | Sept. 18, 1915. | May 22, 1916. |
| 6. Date of completion..... | Completed May 17, 1916. | Completed June 8, 1916. |
| 7. Probable date of completion of contract..... | Sept. 18, 1915. | Sept. 5, 1914. |
| 8. Per cent of completion..... | 100 per cent. | 100 per cent. |
| 9. Total amount of contract..... | \$2,283.64. | \$10,556.63. |
| 10. Total number of cubic yards to be removed under this contract..... | 14,485. | 36,747. |
| 11. Total number of cubic yards removed during the calendar year..... | 14,485. | 23,800. |
| 12. Amount paid to contractor during the calendar year..... | \$2,283.64. | \$5,100.97. |
| 13. Average number of cubic yards removed per month..... | 6,293. | 8,300. |
| 14. Character of material..... | Mud, sand, clay, and shells. | Mud, sand, clay, gravel, and stores. |
| 15. Average distance from work to dump..... | Material cast over banks alongside. | Material cast over banks alongside. |
| 16. Size of bucket and mate..... | 2½ yards, clamshell. | 2½ yards, clamshell. |
| 17. Brief description of dredge and attendant plant..... | See remarks. | See remarks. |
| | <i>Remarks.</i>
Hull 85 by 30 by 9 feet; draft 4½ feet; engine horizontal, 12 by 16 inches; 150 to 100 revolutions per minute; boiler, Scotch, 90-horsepower; coal consumption, 250 pounds per hour; length of baulking boom, 72 feet; coal scow and gasoline launch tender. | <i>Remarks.</i>
Hull 85 by 30 by 9 feet; draft 4½ feet; engine horizontal, 12 by 16 inches; 150 to 100 revolutions per minute; boiler, Scotch, 90-horsepower; coal consumption, 250 pounds per hour; length of baulking boom, 72 feet; coal scow and gasoline launch tender. Estimated quantity of material still to be removed at end of calendar year 1916 about 3,500 cubic yards; amount available for expenditure about \$1,600. Bucket dredge "Little Devil" was also used on this contract. |

TABLE XXVI.

SUBAQUEOUS ROCK DRILLING BY CONTRACT.

4745

TABLE XXVI.—Subaqueous rock drilling by contract during calendar year ending Dec. 31, 1916.

| 1. District..... | Boston, Mass. | Buffalo, N. Y. | Newport, R. I. | First New York. |
|---|---------------------------------|---|--|---------------------------------------|
| 2. Location..... | Gloucester Harbor, Mass..... | Outer harbor and north entrance Buffalo, N. Y..... | New Bedford and Fairhaven Harbors, Mass. | Hudson River at Troy, N. Y. |
| 3. Date of award of contract..... | Jan. 19, 1912..... | July 5, 1916..... | Apr. 5, 1916..... | Oct. 20, 1913. |
| 4. Name of contractor..... | John J. Fitzpatrick & Sons..... | Boston Dredging Co..... | Oliver E. Dunbar, Detroit, Mich. | Great Lakes Dredge & Dock Co. |
| 5. Names of drill boats..... | See Remarks ¹ | Rockland..... | Destroyer and Explosive..... | No. 4. |
| 6. Number of drills..... | do..... | 2..... | Destroyer, 4; Explosive, 4; total, 8..... | 5. |
| 7. Diameter of piston..... | do..... | 44 inches..... | 54 inches..... | 54 inches. |
| 8. Stroke..... | do..... | 54 inches..... | 7 inches..... | 8 inches. |
| 9. Size of bits..... | do..... | 34 inches..... | 24 inches..... | 4 inches. |
| 10. Character of material..... | Granite..... | Lime stone, very hard..... | Granitic rock and harpoon. | Hudson River shale. |
| 11. Number of cubic yards to be removed under contract..... | 2,206.3..... | Unknown; balance of ledges granite and harpoon. | 72,000, place measurement..... | 162,500 (rock original estimate). |
| 12. Distance rock is moved from site..... | 24 to 44 miles..... | 24 to 44 miles..... | 1 to 5 miles..... | 1 to 50 miles. |
| 13. Average depth of water over rock..... | See Remarks ¹ | See Remarks ¹ | 23 feet mean lake level, 572.8 feet, A. T. | From 4 to 9 feet at lowest low water. |
| 14. Number of cubic yards removed to date..... | 2,206.3..... | 1,998 (approximately)..... | 77,258, place measurement..... | 70,921.9 (this plant). |
| 15. Amount of contract..... | \$19,602.60..... | \$5,000..... | \$360,000..... | \$1,028,571.75 (total). |
| 16. Contract price per cubic yard in place..... | \$8.58..... | Lump sum price for balance granite and harpoon..... | \$6..... | \$2.40 and \$2.90 (rock). |
| 17. Amount paid to date..... | \$7.99..... | \$7,528.80..... | \$387,440..... | \$214,084.84 (for rock). |
| 18. Number of cubic yards removed during calendar year..... | 2,062..... | 1,998 (approximately)..... | 14,252, place measurement..... | 21,815.7 (this plant). |
| 19. Amount paid to contractor during calendar year..... | | \$7,528.80..... | \$71,260..... | \$21,906.39 (this plant). |
| 20. Probable date of completion..... | Dec. 30, 1916..... | Dec. 30, 1916..... | Completed Oct. 20, 1916..... | Aug. 31, 1917. |
| 21. Estimated amount of rock removed per day in cubic yards..... | See Remarks ¹ | 13 (scow measurement)..... | Destroyer, 60; Explosive, 53..... | 300. |
| 22. Remarks and description of attendant plant and name of attendant dipper dredge..... | do ¹ | See Remarks ¹ | Hercules..... | Steel hull, 36 by 132 feet, 4 spuds. |

| Remarks. | Remarks. | Remarks. | Remarks. |
|--|---|---|--|
| 1 12-foot ledge, 16.7; 15-foot ledge, 19.7; 13-foot ledge, 21.4; 25-foot ledge, 27.3 (allowing one-half mean range of tide).
* Work completed under emergency contract with Boston Dredging Co., Boston, Mass. (see separate report). | 1 12-foot ledge, 16.7; 15-foot ledge, 19.7; 13-foot ledge, 21.4; 25-foot ledge, 27.3 (allowing one-half mean range of tide).
* Plant attended by small lighter without crew, harbor tug, clamshell dredge, Freeport and scoop dredge Salem.
There is no material remaining to be removed under this contract. (Contract completed.) | Drill boat Destroyer; hull steel, 106 by 30 by 64 feet; draft, 3 feet; 4 drill frames; 4 Ingersoll-Rand H-64 drills, hydraulic pistons for raising and lowering drills and attachments. Drill boat Explorer; wood hull, 97 by 29 by 54 feet; draft, 2 feet; 4 drill frames, 4 Ingersoll-Rand H-64 drills; hydraulic piston for raising and lowering drills and attachments.
The drill boats work three 8-hour shifts each per day, the crew for each 8-hour shift consisting of 14 men. The drill hoists are spaced 5 by 5 feet and are drilled 3 feet below the required grade of 25 feet mean lake level to insure that depth of water after dredging. The general depth of the bedrock is about 2 feet. | A drill boat 65 feet long, 25 feet 10 inches wide, with a draft of 4½ feet. The boat is housed over. Two 3½-inch Ingersoll-Sargent drills are mounted on an upright frame overhanging bow. Plant is supplied with blacksmith outfit, air compressor, Worthington pump, 4-inch section, 3-inch discharge. Lightwood double drum, double cylinder hoisting engine, capable of lifting on a single part 5 tons; boiler 10 feet by 4½ feet upright. Bay State Dredging & Contracting Co.'s dredge No. 5. No material remaining to be removed under contract at end of calendar year. |
| | | | Under Hudson River contract No. 3, 52,172.4 cubic yards of rock, at \$2.40 per cubic yard; 30,791.8 cubic yards of rock, at \$2.80 per cubic yard, and 389,222.9 cubic yards of soft material, at \$0.43 per cubic yard, and 1,034,136.6 cubic yards of soft material, at \$0.491 per cubic yard, at a total contract value of \$803,477.11 have been removed to date. There remains to be removed under this contract approximately 15,000 cubic yards of rock and 100,000 cubic yards of soft material. Amount available for expenditure Dec. 31, 1916, \$382,718.14. This plant drilled and blasted approximately 6,000 cubic yards which has not as yet been removed. Attendant plant: Five tug boats, two coal scows, hydraulic dredge Massachusetts, dipper dredge No. 52 drill boat No. 9, and chisel machine No. 6 were also engaged on this contract. The cost of operating the drill boats and chisel machine is included in the contract price. |

TABLE XXVI.—Subaqueous rock drilling by contract during calendar year ending Dec. 31, 1916—Continued.

| District. | | First, New York. | |
|---|---|---|--|
| 1. District. | | | |
| 2. Location. | Hudson River at Troy, N. Y. | East River (Counties Reef), N. Y. | Hudson River at Troy, N. Y. |
| 3. Date of award of contract. | Oct. 20, 1913. | May 22, 1916. | Oct. 20, 1913. |
| 4. Name of contractor. | Great Lakes Dredge & Dock Co. | Great Lakes Dredge & Dock Co. | Great Lakes Dredge & Dock Co. |
| 5. Names of drill boats. | Chisel Machine No. 6 (P. Sanford Ross) | No. 8. | No. 9. |
| 6. Number of drills. | None. | 5. | 3. |
| 7. Diameter of piston. | do. | 54 inches. | 54 in.-hes. |
| 8. Size of bit. | do. | 12 inches. | 8 in.-hes. |
| 9. Size of bit. | 2 chisels, 16 tons each. | 12 inches. | 4 in.-hes. |
| 10. Character of material. | Hudson River shale. | 4 inches. | Hudson River shale. |
| 11. Number of cubic yards to be removed under contract. | 162,500 (rock, original estimate). | 12 inches. | 162,500 (rock). |
| 12. Distance rock is moved over site. | 1 to 50 miles. | | 1 to 50 miles. |
| 13. Average depth of water over rock. | 10 feet at lowest low water. | | 9 feet at lowest low water. |
| 14. Number of cubic yards removed to date. | 11,895.7 (this plant). | 31.5 feet. | None (this machine). |
| 15. Amount of contract. | \$1,028,871.75 (total). | None. | \$1,028,871.75 (total). |
| 16. Contract price per cubic yard in place. | \$28.827.23 (this plant). | do. | \$2.40 and \$2.90 (rock). |
| 17. Amount paid to date. | \$28,827.23 (this plant). | do. | None (this plant). |
| 18. Number of cubic yards removed during calendar year. | 2,013.7 (total contract). | do. | Do. |
| 19. Amount paid to contractor during calendar year. | \$293,417.29 (total contract). | do. | Do. |
| 20. Probable date of completion. | Aug. 31, 1917. | October, 1917. | Aug. 31, 1917. |
| 21. Estimated amount of rock removed per day in cubic yards. | 100. | | 50. |
| 22. Remarks and description of attendant plant and name of attendant dipper dredge. | Wooden hull, 84 by 35 feet, draft 5 feet. | Attendant plant: 1 launch. | Wooden hull, 28 by 70 feet, draft 5.5 feet. |
| | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> |
| | Under Hudson River contract No. 3, 52,172.4 cubic yards of rock at \$2.40 per cubic yard, 30,731.8 cubic yards of rock at \$2.90 per cubic yard, 338,222.9 cubic yards of soft material at \$0.43 per cubic yard, and 1,034,136.6 cubic yards of soft material at \$0.4091 per cubic yard, at a total contract value of \$803,477.11, have been removed to date. There remains to be removed under this contract approximately 15,000 cubic yards of rock and 100,000 cubic yards of soft material. Amount available for expenditure Dec. 31, 1916, \$382,718.14. Attendant plant: Five tug boats, 2 coal scows, Hydrule dredge, Masejusettis, dipper dredge No. 52, bucket dredges Nos. 43 | The contract with the Great Lakes Dredge & Dock Co. calls for the removal of the reef to a depth of 35 feet at mean low water, for a lump sum of \$73,678.04. | Under Hudson River contract No. 3, 52,172.4 cubic yards of rock at \$2.40 per cubic yard, 30,731.8 cubic yards of rock at \$2.90 per cubic yard, 338,222.9 cubic yards of soft material at \$0.43 per cubic yard, and 1,034,136.6 cubic yards of soft material at \$0.4091 per cubic yard, at a total contract value of \$803,477.11, have been removed to date. There remains to be removed under this contract approximately 15,000 cubic yards of rock and 100,000 cubic yards of soft material. Amount available for expenditure Dec. 31, 1916, \$382,718.14. This plant was employed on rock which has not yet been removed, and in removing high points. Attendant plant: Five tug boats, 2 coal |

and 47, drill boats Nos. 4 and 9 were also engaged on this contract. The cost of operating the drill boats and chisel machine is included in the contract price.

scoops. Hydraulic dredge Massachusetts, dipper dredge No. 32, drill boat No. 4, and chisel machine were also engaged on this contract. The cost of operating the drill boats and chisel machine is included in the contract price.

TABLE XXVI.—Subaqueous rock drilling by contract during the calendar year ending Dec. 31, 1916—Continued.

| 1. District..... | Philadelphia, Pa. | Portland, Me. |
|---|--|--|
| 2. Location..... | Delaware River at Trenton, N. J. | Pepperells Cove, Me. |
| 3. Date of award of contract..... | Oct. 24, 1916..... | Jan. 3, 1914..... |
| 4. Name of contractor..... | Canal Construction Co. (Inc.), New York, N. Y. | Eugene Breymann. |
| 5. Names of drill boats..... | No. 1..... | Racker Rock. |
| 6. Number of drills..... | 1..... | 3..... |
| 7. Diameter of piston..... | 34 inches..... | 64 inches..... |
| 8. Stroke..... | 8 inches..... | 34 inches..... |
| 9. Size of bits..... | 1-inch..... | 1-inch..... |
| 10. Character of material..... | Boston granite..... | 1,284 cubic yards of rock and mud, clay, and gravel. |
| 11. Number of cubic yards to be removed under contract..... | 20,000..... | 7,284 cubic yards in all, and 6,467 overlying material, piece measurement. |
| 12. Distance rock is moved from site..... | 5 miles..... | 1 1/2 miles..... |
| 13. Average depth of water over rock..... | 3 feet..... | 3 to 4..... |
| 14. Number of cubic yards removed to date..... | 2,600 (approximate, piece measurement). ¹ | 32,586 (in scows). |
| 15. Amount of contract..... | \$77,480..... | \$75,840..... |
| 16. Contract price per cubic yard in place..... | See below. ² | \$10 for ledge, removal of overlying material included in price. |
| 17. Amount paid to date..... | \$11,103..... | 7,684..... |
| 18. Number of cubic yards removed during calendar year..... | 2,600..... | 3,284..... |
| 19. Amount paid to contractor during calendar year..... | \$11,103..... | \$75,101.78..... |
| 20. Probable date of completion..... | Dec. 15, 1917..... | Mar. 31, 1916, completed. |
| 21. Estimated amount of rock removed per day, in cubic yards..... | 60..... | 257 cubic yards by dredge while on work. |
| 22. Remarks and description of attendant plant and name of attendant dipper dredge..... | See below. ² | (1) |
| | Remarks.
1 Approximately 8,200 cubic yards, scow measurement, of overburden was removed, in addition to the ledge rock. Approximately 18,000 cubic yards ledge rock and 60,000 cubic yards overburden remaining to be removed. Amount available for expenditure, \$110,000.
2 Contract provides for removal of rock and overburden by plant consisting of 1 dipper dredge (Newburgh or President), 1 tug boat, 1 drill boat (No. 1), 1 coal scow, 5 dump scows, 1 anchor scow and 1 dynamite scow, fully equipped and manned, at the price of \$287 per working day. | Remarks.
1 Drill boat 110 feet by 31 feet 6 inches, 3 steam drills operated by hydraulic cylinders are mounted on tracks on one side of hull; 4 spuds operated by geared steam engines; house contains 2 boilers of about 50 horsepower; hydraulic pump and tank, bilge pump, blacksmith shop. Dipper dredge Eugene, 125 by 44 feet, 14 feet 4 inches deep at bow, 13 feet deep at stern; 2 boilers, 130 pounds pressure; main engines, double horizontal tandem compound, 15 by 28 by 24 inches, double horizontal engine, 10 by 14 inches, double, 2 tugs and 1 scow of 1,200 cubic yards capacity. |

TABLE XXVII.

COAL PURCHASED BY B. T. U. METHOD.

13751—ENG 1917—800

4751

TABLE XXVII.—Coal purchased by the B. t. u. method during the calendar year ending Dec. 31, 1916.

| District..... | Charleston, S. C. | Grand Rapids, Mich. | Jacksonville, Fla. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|-------------------------------|---|----------------|------|------|-----|------|-------|------|--------|-----------|---|-----------|-------------------------------|----------------|----------------|------|------|-----|-----|-------|-------|--------|--------|--|-----------|-------------------------------|---------------|----------------|-----|------|-----|-----|------|-------|--------|--------|---|-----------|-------------------------------|---------------|----------------|-----|------|--|-----|--|-------|--------|--------|---|-----------|-------------------------------|---------------|----------------|-----|------|-----|-----|-------|-------|--------|--------|
| 1. Contractor..... | Clinchfield Fuel Co..... | Home Fuel Co..... | Alabama Fuel & Iron Co..... | Logan Coal & Supply Co..... | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. Date of award of contract..... | Apr. 7, 1915..... | Mar. 28, 1916..... | Apr. 10, 1916..... | Aug. 2, 1916..... | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. Percentage of completion..... | 100 per cent..... | 90 per cent..... | 100 per cent..... | 100 per cent..... | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. Name of mine..... | Clinchfield Coal Corporation..... | Nos. 112 and 219..... | Acton..... | Fire Creek and Sewell seam on C. & O. R. R. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. Location of mine..... | Dante, Russell County, Va..... | Carbondale, Kanawha County, W. Va..... | Acton, Ala..... | Layland, W. Va., and Munden, W. Va. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. Name of coal..... | Clinchfield..... | Smithers Creek, three-fourths gas..... | Acton washed steam..... | Berwinds New River. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. Kind of coal..... | Run of mine..... | Bituminous..... | Bituminous..... | Bituminous. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8. Amount of coal contracted for:
(a) In long tons.....
(b) In short tons..... | 2,000..... | Approximately 2,125 tons.
Approximately 2,500 tons..... | 2,000..... | 4,000 tons. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9. Analysis:
(a) Percentage of moisture (as delivered).....
(b) Ash in dry coal.....
(c) Sulphur in dry coal.....
(d) Volatile matter.....
(e) B. t. u..... | <table><tr><td>With bld.</td><td>Average of Government's test.</td></tr><tr><td>Per cent. 2.00</td><td>Per cent. 2.00</td></tr><tr><td>8.00</td><td>8.00</td></tr><tr><td>.75</td><td>.606</td></tr><tr><td>36.00</td><td>35.9</td></tr><tr><td>14,000</td><td>14,222.50</td></tr></table> | With bld. | Average of Government's test. | Per cent. 2.00 | Per cent. 2.00 | 8.00 | 8.00 | .75 | .606 | 36.00 | 35.9 | 14,000 | 14,222.50 | <table><tr><td>With bld.</td><td>Average of Government's test.</td></tr><tr><td>Per cent. 1.90</td><td>Per cent. 1.98</td></tr><tr><td>5.50</td><td>5.30</td></tr><tr><td>.85</td><td>.98</td></tr><tr><td>37.37</td><td>36.54</td></tr><tr><td>14,400</td><td>14,539</td></tr></table> | With bld. | Average of Government's test. | Per cent. 1.90 | Per cent. 1.98 | 5.50 | 5.30 | .85 | .98 | 37.37 | 36.54 | 14,400 | 14,539 | <table><tr><td>With bld.</td><td>Average of Government's test.</td></tr><tr><td>Per cent. 3.0</td><td>Per cent. 1.95</td></tr><tr><td>4.0</td><td>2.77</td></tr><tr><td>1.0</td><td>.60</td></tr><tr><td>32.0</td><td>32.80</td></tr><tr><td>14,900</td><td>15,020</td></tr></table> | With bld. | Average of Government's test. | Per cent. 3.0 | Per cent. 1.95 | 4.0 | 2.77 | 1.0 | .60 | 32.0 | 32.80 | 14,900 | 15,020 | <table><tr><td>With bld.</td><td>Average of Government's test.</td></tr><tr><td>Per cent. 3.0</td><td>Per cent. 2.42</td></tr><tr><td>5.0</td><td>8.15</td></tr><tr><td></td><td>.51</td></tr><tr><td></td><td>32.94</td></tr><tr><td>14,500</td><td>13,651</td></tr></table> | With bld. | Average of Government's test. | Per cent. 3.0 | Per cent. 2.42 | 5.0 | 8.15 | | .51 | | 32.94 | 14,500 | 13,651 | <table><tr><td>With bld.</td><td>Average of Government's test.</td></tr><tr><td>Per cent. 1.7</td><td>Per cent. 1.96</td></tr><tr><td>6.0</td><td>5.26</td></tr><tr><td>.70</td><td>.68</td></tr><tr><td>22.52</td><td>22.13</td></tr><tr><td>14,850</td><td>14,567</td></tr></table> | With bld. | Average of Government's test. | Per cent. 1.7 | Per cent. 1.96 | 6.0 | 5.26 | .70 | .68 | 22.52 | 22.13 | 14,850 | 14,567 |
| With bld. | Average of Government's test. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Per cent. 2.00 | Per cent. 2.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8.00 | 8.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| .75 | .606 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36.00 | 35.9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14,000 | 14,222.50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| With bld. | Average of Government's test. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Per cent. 1.90 | Per cent. 1.98 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.50 | 5.30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| .85 | .98 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37.37 | 36.54 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14,400 | 14,539 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| With bld. | Average of Government's test. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Per cent. 3.0 | Per cent. 1.95 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4.0 | 2.77 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.0 | .60 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32.0 | 32.80 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14,900 | 15,020 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| With bld. | Average of Government's test. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Per cent. 3.0 | Per cent. 2.42 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.0 | 8.15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | .51 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 32.94 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14,500 | 13,651 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| With bld. | Average of Government's test. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Per cent. 1.7 | Per cent. 1.96 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.0 | 5.26 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| .70 | .68 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22.52 | 22.13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14,850 | 14,567 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Price per 1,000 B. t. u..... | 12.29 cents..... | 5.51 cents..... | 4.28 cents..... | 12.6 cents..... | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | Short tons. | Long tons. | Short tons. | | | Short tons. | Long tons. | Short tons. | Long tons. | Remarks. |
|---|-------------|------------|---|--------|--------|-----------------------|------------|-----------------------|------------|---|
| | | | (a) | (b) | (c) | | | | | |
| 11. Bidder's price per ton. | \$3.30 | | \$3.08 | \$3.30 | \$3.40 | \$1.60 | | \$1.32 | | |
| 12. Contract price per ton established by proposal. | \$3.30 | | 3.08 | 3.30 | 3.40 | \$1.60 | | \$1.32 | | \$4.42.
\$4.42. |
| 13. Average adjusted price per ton of coal as delivered. | \$3.31825 | | 3.08 | 3.32 | 3.40 | \$1.60 | | \$1.2442 | | \$4.213. |
| 14. Total amount paid to contractor during calendar year. | \$2,044.51 | | \$5,844.72 | | | \$2,319.09 | | \$2,708.15 | | \$18,055.27. |
| 15. Total number of tons paid for during calendar year. | 619.95 | | 1,798.85 | | | 1,564.7 | | 2,173.45 | | 3,810.43. |
| 16. Remarks on coal as delivered. | Good | | Good | | | Good | | Fair | | Good. |
| 17. Give brief description of method used by contractor in delivering coal. | (1) | | Delivered in carload lots at various harbors as ordered, being approximately 90 tons per week. | | | In gondolas to wharf. | | In gondolas to wharf. | | Electric crane and coal chute. |
| | | | Remarks. | | | | | | | |
| | | | (a) At St. Joseph, South Haven, Holland, Grand Haven, and Muskegon, Mich.
(b) At Ludington, Manistee, and Frankfort, Mich.
(c) At Charlevoix, Mich. | | | | | | | 2,112.15 tons were purchased in open market at a cost of \$7,301.19 for use of all steam plant. |

TABLE XXVII.—Coal purchased by the B. t. u. method during the calendar year ending Dec. 31, 1916—Continued.

| District..... | Mobile, Ala. | | | | | | | | | |
|--|---|---|--|--|--|---|---|---|----------------------|--|
| 1. Contractor..... | Gulf States Coal Co. | Sunlight Mining Co. | Alabama Fuel & Iron Co. | Brown-Morgan Coal Co. | Imperial Coal & Coke Co. | | | | | |
| 2. Date of award of contract..... | Mar. 15, 1915..... | None..... | None..... | None..... | Aug. 21, 1916..... | | | | | |
| 3. Percentage of completion..... | 100..... | No contract..... | No contract..... | No contract..... | 39.09..... | | | | | |
| 4. Name of mine..... | Dixiana Mines of Imperial Coal & Coke Co. | Sunlight..... | Acton..... | Biecton-Cahaba..... | Dixiana..... | | | | | |
| 5. Location of mine..... | Dixiana, Jefferson County, Ala. | Sunlight, Walker County, Ala. | Acton, Shelby County, Ala. | Galena, Ala. | Dixiana, Jefferson County, Ala. | | | | | |
| 6. Name of coal..... | Imperial Washed Pes. Bituminous. | Sunlight Black Creek Bituminous. | Acton Washed Steam Coal Bituminous. | Coleman Washed Pes. Bituminous. | Imperial Washed Pes. Bituminous. | | | | | |
| 7. Kind of coal..... | Imperial Washed Pes. Bituminous. | Sunlight Black Creek Bituminous. | Acton Washed Steam Coal Bituminous. | Coleman Washed Pes. Bituminous. | Imperial Washed Pes. Bituminous. | | | | | |
| 8. Amount of coal contracted for:
(a) In long tons.....
(b) In short tons..... | 18,000..... | No contract..... | No contract..... | No contract..... | 12,000..... | | | | | |
| 9. Analysis:
(a) Percentage of moisture (as delivered).
(b) Ash in dry coal.
(c) Sulphur in dry coal.
(d) Volatile matter.
(e) B. t. u..... | With bid.
Per cent.
3.00
4.00
1.00
30.00
14,800 | Average of Government's test.
Per cent.
3.46
6.55
1.75
38.50
14,400 | With bid.
Per cent.
3.00
5.00
.75
34.00
14,500 | Average of Government's test.
Per cent.
3.40
7.60
.50
34.50
12,860 | With bid.
Per cent.
(1)
14.00
.75
32.00
13,000 | Average of Government's test.
Per cent.
3.60
13.10
.75
34.70
12,870 | With bid.
Per cent.
3.00
4.00
1.00
32.00
14,800 | Average of Government's test.
Per cent.
12.74
5.81
.65
21.68
14,500 | | |
| 10. Price per 1,000,000 B. t. u..... | \$0.0698 | \$0.064 | \$0.068 | \$0.0727 | \$0.0727 | \$0.750 | | | | |
| 11. Bidder's price per ton..... | Short tons.
\$1.38 | Short tons.
\$1.05 | Short tons.
\$1.33 | Short tons.
\$1.16 | Short tons.
\$1.50 | Long tons.
\$1.526 | Long tons.
\$1.50 | Long tons.
\$1.526 | Long tons.
\$1.50 | |
| 12. Contract price per ton established by journal..... | Short tons.
\$1.38 | Short tons.
\$1.05 | Short tons.
\$1.33 | Short tons.
\$1.16 | Short tons.
\$1.50 | Long tons.
\$1.526 | Long tons.
\$1.50 | Long tons.
\$1.526 | Long tons.
\$1.50 | |

| | | | | | |
|---|---|--|---|---|-----------------------|
| 13. Average adjusted price per ton of coal as delivered. | \$1.326 | \$0.973 | \$1.246 | \$1.166 | \$1.458 |
| 14. Total amount paid to contractor during calendar year. | \$4,365.75 | \$276.83 | \$169.33 | \$46.14 | (6) |
| 15. Total number of tons paid for during calendar year. | 3,881.80 | 284.5 | 135.9 | 39.5 | (7) |
| 16. Remarks on coal as delivered. | Excellent steam coal | Free-burning steam coal | Not considered a first-class steam coal | Very poor steam coal | Excellent steam coal |
| 17. Give brief description of method used by contractor in delivering coal. | Delivered on United States barges over railroad tippie. | F. o. b. cars at mine | F. o. b. cars at mine | F. o. b. cars at mine | F. o. b. cars at mine |
| | <i>Remarks.</i>
1 Price includes \$0.001 per 1,000/100 B. t. u.'s for water and is price f. o. b. Government barges at Mobile on Government bill of lading.
2 Price f. o. b. mines. Rate on Government bill of lading from Dixiana to Mobile is \$0.6831 per short ton.
3 F. o. b. mines.
4 Price f. o. b. mines on coal received during year.
5 Includes payment of retained percentages on completion of contract.
6 Amount received during year was 2,463.25 tons. | <i>Remarks.</i>
1 As received on barge at Mobile, Ala.
2 Price is f. o. b. Government barges at Mobile on Government bill of lading.
3 Price f. o. b. mines. Rate on Government bill of lading from Dixiana to Mobile, \$0.8923 per short ton.
4 F. o. b. mines.
5 F. o. b. mines.
6 This coal clickers some and is not considered a first-class steam coal. | <i>Remarks.</i>
1 As received on barge at Mobile, Ala.
2 Price is f. o. b. Government barges at Mobile on Government bill of lading.
3 Price f. o. b. mines. Rate on Government bill of lading from Dixiana to Mobile, \$0.6831 per short ton.
4 F. o. b. mines.
5 Rate on Government bill of lading Valencia to Mobile is \$0.7043. | <i>Remarks.</i>
1 As received on barge at Mobile, Ala.
2 Price f. o. b. Government barges at Mobile, Ala., on Government bill of lading.
3 F. o. b. mines. Rate on Government bill of lading from Dixiana to Mobile is \$0.6831 per short ton.
4 F. o. b. mines.
5 This is the adjusted price based on 2,850.1 tons of coal on which analysis has been received.
6 Nothing.
7 The total number of tons received during year was 4,690.6 short tons.
8 This being a washed coal when loaded on cars at mine contains a large percentage of moisture, but by the time this coal is loaded on barges at Mobile, Ala., a large part of this moisture has dried out. | |

TABLE XXVII.—Coal purchased by the B. t. u. method during the calendar year ending Dec. 31, 1916—Continued.

| District..... | New Orleans, La. | | | | | | | | | | Mississippi River, fourth. | |
|--|---|--|--|--|---|--|--|--|-------------------------------|--|----------------------------|--|
| 1. Contractor..... | Tennessee Coal, Iron & Railroad Co.
June 16, 1916..... | | Tennessee Coal, Iron & Railroad Co.
Aug. 3, 1916..... | | New Orleans Coal Co.
Aug. 9, 1916..... | | Robt. P. Hyams Coal Co. (Ltd.)
June 14, 1916..... | | | | | |
| 2. Date of award of contract..... | Completed..... | | 50..... | | 50..... | | Completed..... | | | | | |
| 3. Percentage of completion..... | Old Pratt..... | | Old Pratt..... | | Elvista..... | | Pala..... | | | | | |
| 4. Name of mine..... | Birmingham, Ala. | | Birmingham, Ala. | | Elvista, Ala. | | Alabama..... | | | | | |
| 5. Location of mine..... | Old Pratt..... | | Old Pratt..... | | Warrior Black Creek | | Pala..... | | | | | |
| 6. Name of coal..... | Run of mine..... | | Run of mine..... | | Run of mine..... | | Unwashed run of mine..... | | | | | |
| 7. Kind of coal..... | 13,500..... | | 15,000..... | | 1,000..... | | 800..... | | | | | |
| 8. Amount of coal contracted for:
(a) in long tons.....
(b) in short tons..... | | | | | | | | | | | | |
| 9. Analysis: | Per cent. 2.50 | | Per cent. 1.26 | | Average of Government's test. | | With bid. | | Average of Government's test. | | With bid. | |
| (a) Percentage of moisture (as delivered)..... | 5.00 | | 6.92 | | Per cent. 1.7 | | Per cent. 3 | | Per cent. 1.30 | | Per cent. 1.90 | |
| (b) Ash in dry coal..... | 1.33 | | 1.51 | | 6.5 | | 4 | | 10.80 | | 7.10 | |
| (c) Sulphur in dry coal..... | 29.50 | | 29.19 | | 1.36 | | 2 | | 2.45 | | .80 | |
| (d) Volatile matter..... | 14,750 | | 14,619 | | 29.2 | | 20 | | 22.10 | | 30.76 | |
| (e) B. t. u..... | | | | | 14,900 | | 14,500 | | 13,060 | | 14,206 | |
| 10. Price per 1,000,000 B. t. u..... | 11.86 cents. | | | | 11 cents | | 11 cents | | 11 cents | | | |
| 11. Bidder's price per ton..... | Short tons. | | Long tons. | | Short tons. | | Long tons. | | Short tons. | | Long tons. | |
| 12. Contract price per ton established by proposal..... | \$3.50 | | \$2.45 | | \$2.35 | | \$2.45 | | \$2.35 | | \$2.45 | |
| | \$3.02 | | \$2.08 | | \$2.08 | | \$2.08 | | \$2.08 | | \$2.08 | |

| | | | | | | | |
|---|---|--|---|---|---|--|---|
| 13. Average adjusted price per ton of coal as delivered. | \$3.477 | | \$3.268 | \$3.007 | \$3.129 | | |
| 14. Total amount paid to contractor during calendar year. | \$43,477.00 | | \$15,038.10 | (1) | \$2,283.39 | | |
| 15. Total number of tons paid for during calendar year. | 12,510.35 | | 4,482.1 | (1) | 735.44 | | |
| 16. Remarks on coal as delivered. | Satisfactory. | | Satisfactory. | Satisfactory. | Satisfactory. | | |
| 17. Give brief description of method used by contractor in delivering coal. | See Remarks. | | See Remarks. | By barges containing 10,000 barrels each; unloading same by means of steam conveyors. | By barges; unloading in dredge coal bins by means of steam conveyors. | | Remarks.
Nearly every commercial type of boiler is in use in this district—external fired, internal fired, and water-tube. Purchase of coal by the B. t. u. method does not give satisfactory results under the great difference in conditions. The actual service test was, therefore, used. On account of car shortage and the urgent necessity of having fuel, much of the coal used during the past year was purchased in the open market. |
| | Remarks.
Modern steel fuel collier, self-propelled, capacity of 1,000 tons and equipped with all necessary handling devices, including standard automatic scale. Coal delivered in Government yards. | | Remarks.
Modern steel fuel collier, self-propelled, capacity of 1,000 tons and equipped with all necessary handling devices, including standard automatic scale. Coal delivered in Government yards. | Remarks.
Not yet paid. | | | |

TABLE XXVII.—Coal purchased by the B. t. u. method during the calendar year ending Dec. 31, 1916—Continued.

| District..... | Norfolk, Va. | | Second New York. | | Philadelphia, Pa. | |
|--|---------------------------------------|-------------------------------|---|---------------------------------------|---------------------------------------|--|
| 1. Contractor..... | Castner, Curran & Bullitt, Inc. | The Nottingham & Wrenn Co. | Commercial Coal Co. | Sterling Coal Co., Philadelphia, Pa. | Sterling Coal Co., Philadelphia, Pa. | |
| 2. Date of award of contract..... | Dec. 31, 1915..... | June 30, 1916..... | Nov. 26, 1915..... | June 14, 1916..... | Apr. 29, 1915..... | |
| 3. Percentage of completion..... | 100..... | 24.2..... | 100..... | 50..... | 100..... | |
| 4. Name of mine..... | Various mines in Pocahontas district. | Leckie..... | Faustwell..... | Nos. 1 to 6, inclusive..... | Nos. 1 to 7, inclusive..... | |
| 5. Location of mine..... | McDowell and Mercer Counties, W. Va. | McDowell County, W. Va..... | Faustwell, Pa..... | B or Miller vein, Cambria County, Pa. | B or Miller vein, Cambria County, Pa. | |
| 6. Name of coal..... | C. C. B. Pocahontas. | Pocahontas No. 3 vein..... | Commercialadmiraity brand Bituminous..... | Powellton..... | Powellton..... | |
| 7. Kind of coal..... | Bituminous..... | Bituminous..... | Bituminous..... | Semibituminous..... | Semibituminous..... | |
| 8. Amount of coal contracted for:
(a) In long tons.
(b) In short tons..... | 3,000..... | 3,000..... | 9,000 to 26,000..... | 26,000..... | 29,000..... | |
| 9. Analysis:
(a) Percentage of moisture (as delivered).
(b) Ash in dry coal.
(c) Sulphur in dry coal.
(d) Volatile matter.
(e) B. t. u..... | With bid. | With bid. | With bid. | With bid. | With bid. | |
| | Average of Government's test. | Average of Government's test. | Average of Government's test. | Average of Government's test. | Average of Government's test. | |
| | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | |
| | 2.75 | 1.56 | 3 | 1.75 | 1.75 | |
| | 6.75 | 6.0 | 84 | 6.0 | 6.0 | |
| 10. Price per 1,000,000 B. t. u..... | .60 | .76 | 2 | 1.1 | 1.1 | |
| | 18.00 | 17.84 | 20 | 19.5 | 19.5 | |
| | 14,750 | 14,650 | 14,400 | 14,600 | 14,600 | |
| | Average of Government's test. | Average of Government's test. | Average of Government's test. | Average of Government's test. | Average of Government's test. | |
| | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | |
| | 1.896 | 4.31 | 3.647 | 2.53 | 2.95 | |
| | \$0.0628 | \$0.06468 | \$0.1096, \$0.0959, \$0.1005..... | \$0.0999, \$0.0962, \$0.0909..... | | |

[illegible]

TABLE XXVII.—Coal purchased by the B. t. u. method during the calendar year ending Dec. 31, 1916—Continued.

| District..... | Norfolk, Va. | | Second New York. | | Philadelphia, Pa. | |
|--|---------------------------------------|-------------------------------|-------------------------------------|-------------------------------|---------------------------------------|-------------------------------|
| 1. Contractor..... | Castner, Curran & Bullitt, Inc. | | Commercial Coal Co. | | Sterling Coal Co., Philadelphia, Pa. | |
| 2. Date of award of contract..... | Dec. 31, 1915..... | | Nov. 26, 1915..... | | June 14, 1916..... | |
| 3. Percentage of completion..... | 100..... | | 100..... | | 100..... | |
| 4. Name of mine..... | Various mines in Pocahontas district. | | Faustwell..... | | Nos. 1 to 6, inclusive..... | |
| 5. Location of mine..... | McDowell and Mercer Counties, W. Va. | | Faustwell, Pa. | | B or Miller vein, Cambria County, Pa. | |
| 6. Name of coal..... | C. C. B. Pocahontas. | | Commercialmineral brand Bituminous. | | Powelton. | |
| 7. Kind of coal..... | Bituminous. | | 9,000 to 25,000..... | | Semitbituminous. | |
| 8. Amount of coal contracted for:
(a) In long tons.
(b) In short tons. | 3,000..... | | 9,000 to 25,000..... | | 25,000..... | |
| 9. Analysis:
(a) Percentage of moisture (as delivered).
(b) Ash in dry coal.
(c) Sulphur in dry coal.
(d) Volatile matter.
(e) B. t. u. | With bid. | Average of Government's test. | With bid. | Average of Government's test. | With bid. | Average of Government's test. |
| | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. |
| | 2.75 | 1.886 | 3 | 3.647 | 1.75 | 2.58 |
| 10. Price per 1,000,000 B. t. u. | 6.75 | 6.64 | 84 | 9.237 | 6.0 | 8.0 |
| | .60 | .604 | 2 | 1.738 | 1.1 | 1.74 |
| | 13.00 | 13.1 | 20 | 20.188 | 19.5 | 22.7 |
| | 14,750 | 14,638 | 14,400 | 14,056.5 | 14,600 | 14,368 |
| | \$0.0626 | \$0.06468 | | \$0.1086, \$0.0969, \$0.1005 | | \$0.0999, \$0.0962, \$0.0909. |

| | Short tons. | Long tons. | Short tons. | Long tons. | Short tons. | Long tons. | Short tons. | Long tons. | Short tons. | Long tons. |
|---|---|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|
| 11. Bidder's price per ton.. | \$2.39 | | | | | | | | | |
| 12. Contract price per ton established by proposal. | \$2.442 | | | | | | | | | |
| 13. Average adjusted price per ton of coal as delivered. | \$2.384 | | | | | | | | | |
| 14. Total amount paid to contractor during calendar year. | \$6,469.60 | | | | | | | | | |
| 15. Total number of tons paid for during calendar year. | 2,713.55 | | | | | | | | | |
| 16. Remarks on coal as delivered. | Good..... | | | | | | | | | |
| 17. Give brief description of method used by contractor in delivering coal. | See Remarks. | | | | | | | | | |
| | Good..... | | | | | | | | | |
| | See Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 12 cars per month, each car containing about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | | | | | |
| | Delivered in carload lots of about 50 short tons. Coal dumped directly from cars to deck of scows. | | | | | | | | | |
| | Remarks. | | | | | </ | | | | |

TABLE XXVII.—Coal purchased by the B. t. u. method during the calendar year ending Dec. 31, 1916—Continued.

| District..... | Second, Portland, Oreg. | | Rock Island, Ill. | | | |
|--|--|--|---|--|--|-------------------------------|
| | Durham Colliery Co., Tacoma, Wash.
June 10, 1915..... | Durham Colliery Co., Tacoma, Wash.
July 28, 1916..... | Rutledge & Taylor Coal Co.,
Apr. 20, 1916..... | Rutledge & Taylor Coal Co.,
July 8, 1916..... | Rutledge & Taylor Coal Co.,
July 8, 1916..... | |
| 1. Contractor..... | | | | | | |
| 2. Date of award of contract..... | | | | | | |
| 3. Percentage of completion..... | 100; final delivery, July 10, 1916..... | 50 (approximate)..... | 100..... | 100..... | 100..... | |
| 4. Name of mine..... | Durham..... | Durham..... | Security Mine..... | Security Mine..... | Security Mine..... | |
| 5. Location of mine..... | Durham, Wash..... | Durham, Wash..... | Du Quoin, Perry County, Ill..... | Du Quoin, Perry County, Ill..... | Du Quoin, Perry County, Ill..... | |
| 6. Name of coal..... | Durham washed steam..... | Durham washed steam..... | Security..... | Security..... | Security..... | |
| 7. Kind of coal..... | Bituminous; mine run..... | Bituminous; mine run..... | 3 by 6 inch, egg..... | 3 by 6 inch, egg..... | 1½ inch, screenings..... | |
| 8. Amount of coal contracted for:
(a) in long tons.....
(b) in short tons..... | 4,000 (approximate)..... | 4,000 (approximate)..... | 4,000..... | 20,500..... | 1,500..... | |
| 9. Analysis:
(a) Percentage of moisture (as delivered),
(b) Ash in dry coal,
(c) Sulphur in dry coal,
(d) Volatile matter,
(e) B. t. u..... | With bid. | With bid. | With bid. | With bid. | With bid. | Average of Government's test. |
| | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. |
| | 5.00 | 4.76 | 7.50 | 7.50 | 9.30 | 8.02 |
| | 14.00 | 17.54 | 9.00 | 9.00 | 10.00 | 13.63 |
| 10. Price per 1,000,000 B. t. u. delivered. | .78 | .78 | 1.60 | 1.60 | 1.70 | 2.38 |
| | 31.00 | 31.35 | 38.00 | 33.00 | 35.00 | 34.18 |
| | 12,300 | 12,225 | 13,075 | 13,075 | 12,800 | 12,179 |
| | \$0.0882 at mine; \$0.142 delivered. | \$0.0845 at mine; \$0.139 delivered. | \$0.047954..... | \$0.049398..... | \$0.0278..... | |

FLOATING PLANT.

4761

| | Short tons. | Long tons. | Short tons. | Long tons. | Short tons. | Long tons. | Short tons. | Long tons. | Short tons. | Long tons. |
|---|--------------------------------|------------|--------------------------------|------------|--------------------------|------------|--------------------------|------------|----------------------|------------|
| 11. Bidder's price per ton..... | | | | | | | | | | |
| 12. Contract price per ton established by proposal..... | \$2.35
\$2.43 | | | | \$1.20
\$1.264 | | \$1.24
\$1.297 | | \$0.75
\$0.686 | |
| 13. Average adjusted price per ton of coal as delivered..... | \$2.183 | | | \$2.159 | \$1.163 | | \$1.231 | | \$0.659 | |
| 14. Total amount paid to contractor during calendar year..... | \$3,937.60 | | | \$3,917.66 | \$3,062.27 | | \$16,828.63 | | \$2622.67 | |
| 15. Total number of tons paid for during calendar year..... | 1,803.29 | | | 1,839.35 | 3,150.70 | | 13,673.85 | | 944.65 | |
| 16. Remarks on coal as delivered..... | Fair..... | | Fair..... | | Good grade..... | | Good grade..... | | Good grade..... | |
| 17. Give brief description of method used by contractor in delivering coal..... | Delivered f.o.b. cars at mine. | | Delivered f.o.b. cars at mine. | | F.o.b. cars at mine..... | | F.o.b. cars at mine..... | | F.o.b. cars at mine. | |
| | | | <i>Remarks.</i> | | | | | | | |
| | | | | | | | | | | |

1 Includes 328 tons estimated, as analysis for that quantity was not received from Bureau of Mines in time to embody in this report.

TABLE XXVII.—Coal purchased by the B. I. u. method during the calendar year ending Dec. 31, 1916—Continued.

| District | Savannah, Ga. | | St. Louis, Mo. | |
|--|-------------------------------|-------------------------------|---|---|
| 1. Contractor | Taggart Coal Co. | Taggart Coal Co. | The Monongahela River Consolidated Coal & Coke Co. ¹ | The Monongahela River Consolidated Coal & Coke Co. ¹ |
| 2. Date of award of contract | Apr. 6, 1916 | Apr. 5, 1915 | Jan. 3, 1916 | Jan. 3, 1916 |
| 3. Percentage of completion | 75 | 100; completed Mar. 31, 1916 | 100 | 100 |
| 4. Name of mine | Wise County, Va. | Inman | Cypress Creek | Cypress Creek |
| 5. Location of mine | do | Near Appalachia, Va. | Dekoven, Ky. | Dekoven, Ky. |
| 6. Name of coal | Taggart's Navigation | Inman | Cypress Creek | Cypress Creek |
| 7. Kind of coal | Bituminous | Bituminous | Mine run, bituminous | Mine run, bituminous |
| 8. Amount of coal contracted for:
(a) In long tons
(b) In short tons | About 280 tons weekly | About 220 tons weekly | 4,000 | 500 |
| 9. Analysis:
(a) Percentage of moisture (as delivered).
(b) Ash in dry coal.
(c) Sulphur in dry coal.
(d) Volatile matter.
(e) P. t. u. | Average of Government's test. | Average of Government's test. | Average of Government's test. | Average of Government's test. |
| | Per cent. | Per cent. | Per cent. | Per cent. |
| | 2 | 2 | 3 | 3 |
| | 1.92 | 1.89 | 4.81 | 4.62 |
| 10. Price per 1,000,000 B. t. u. | With bid. | With bid. | With bid. | With bid. |
| | Per cent. | Per cent. | Per cent. | Per cent. |
| | 2 | 2 | 3 | 3 |
| | 11.017 | 11.643 | 12,500 | 12,500 |
| \$0.11017 | | \$0.11643 | \$0.0983 | \$0.1128 |

| | Short tons. | Long tons. | Short tons. | Long tons. | Short tons. | Long tons. | Short tons. | Long tons. | Short tons. | Long tons. | Short tons. | Long tons. |
|---|--------------------------------------|-------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|
| 11. Bidder's price per ton. | | | | | | | | | | | | |
| 12. Contract price per ton established by proposal. | | \$3.64 | | \$3.79 | | \$2.20 | | \$2.52 | | \$2.83 | | |
| 13. Average adjusted price per ton of coal as delivered. | | \$3.67 | | \$3.80 | | \$2.15 | | \$2.46 | | \$2.83 | | |
| 14. Total amount paid to contractor during calendar year. | | \$26,955.29 | | \$8,314.50 | | \$5,372.02 | | \$2,323.74 | | \$901.43 | | |
| 15. Total number of tons paid for during calendar year. | | 7,344.03 | | 2,187.04 | | 2,496.53 | | 927.350 | | 333.17 | | |
| 16. Remarks on coal as delivered. | Good. | | | | | | | | | | | |
| 17. Give brief description of method used by contractor in delivering coal. | Aboard steamers by hand from barges. | | | | | | | | | | | |
| | Remarks. | | | | | | | | | | | |
| | Delivered at Rosedale, Miss. | | | | | | | | | | | |
| | Succeeded by Pittsburgh Coal Co. | | | | | | | | | | | |

TABLE XXVII.—Coal purchased by the B. t. u. method during the calendar year ending Dec. 31, 1916—Continued.

| District..... | St. Louis, Mo. | | | | | | | | | | | |
|---|---|--|---|--|---|--|---|--|---|--|---|--|
| 1. Contractor..... | The Monongahela River Consolidated Coal & Coke Co., ¹ | | The Monongahela River Consolidated Coal & Coke Co., ¹ | | Southern Coal, Coke & Mining Co. | | West Kentucky Coal Co..... | | O'Gara Coal Co., trustees. | | | |
| 2. Date of award of contract. | Jan. 3, 1916..... | | Jan. 3, 1916..... | | Jan. 13, 1916..... | | Jan. 17, 1916..... | | Jan. 26, 1916. | | | |
| 3. Percentage of completion. | 100..... | | 100..... | | 100..... | | 100..... | | 100..... | | | |
| 4. Name of mine..... | Cypress Creek..... | | Cypress Creek..... | | Southern Coal, Coke & Mining Co. | | Nos. 1, 2, 8, 9..... | | O'Gara Coal Co., Nos. 8, 10, 11. | | | |
| 5. Location of mine..... | Dekoven, Ky..... | | Dekoven, Ky..... | | Cling County, Ill..... | | New Sturgis, Ky..... | | Eldorado, Ill. | | | |
| 6. Name of coal..... | Cypress Creek..... | | Cypress Creek..... | | New Baden..... | | Tadewater..... | | Hardsburg..... | | | |
| 7. Kind of coal..... | Mine run, bituminous..... | | Mine run, bituminous..... | | Mine run, bituminous..... | | Mine run, bituminous..... | | Mine run, bituminous..... | | | |
| 8. Amount of coal contracted for:
(a) In long tons.....
(b) In short tons..... | 1,000.....
500..... | | 1,000.....
500..... | | (1).....
1,000..... | | 1,000.....
1,000..... | | 1,000.....
1,000..... | | | |
| 9. Analysis:
(a) Percentage of moisture (as delivered).
(b) Ash in dry coal..
(c) Sulphur in dry coal..
(d) Volatile matter..
(e) B. t. u..... | Average of Government's test.

With bid.

Per cent. 3
13
3½
34
12,500 | | Average of Government's test.

With bid.

Per cent. 3
13
3½
34
12,500 | | Average of Government's test.

With bid.

Per cent. 10
13
4
25
12,000 | | Average of Government's test.

With bid.

Per cent. 4
9
2.8
35
13,000 | | Average of Government's test.

With bid.

Per cent. 7
9
2.4
35
13,300 | | Average of Government's test.

Per cent. 7.32
10.5
2.59
34.8
12,800 | |
| 10. Price per 1,000,000 B. t. u..... | \$0.1237..... | | \$0.1504..... | | \$0.0586..... | | \$0.1321..... | | \$0.0648..... | | | |

| | Long tons. | | Short tons. | | Long tons. | | Short tons. | | Long tons. | | Short tons. | | Remarks. |
|---|--|--------------------------------------|--|--------------------------------------|--|--|--|--|-------------|--|-------------|---|----------|
| | Short tons. | Long tons. | Short tons. | Long tons. | Short tons. | Long tons. | Short tons. | Long tons. | Short tons. | Long tons. | Short tons. | Long tons. | |
| 11. Bidder's price per ton. | \$3.24 | | \$3.84 | | | (*) | \$1.40 | | | | (1) | \$1.75 | |
| 12. Contract price per ton established by process. | | | | | | | | | | | | | |
| 13. Average adjusted price per ton of coal as delivered. | \$3.142 | | \$3.798 | | | \$1.686 | \$1.386 | | | | (3) | \$1.66 | |
| 14. Total amount paid to contractor during calendar year. | \$1,077.93 | | \$1,160.55 | | | | \$18,320.25 | | | | \$1,802.10 | \$1,806.70 | |
| 15. Total number of tons paid for during calendar year. | 342.98 | | 310.3 | | | | 12,602.9 | | | | 580.02 | 1,064.10 | |
| 16. Remarks on coal as delivered. | Good..... | Aboard steamers by hand from barges. | Good..... | Aboard steamers by hand from barges. | Good..... | Aboard steamers by hand from barges; on U. S. barges from coal tipple. | Good..... | Aboard steamers by hand from barges; alongside steamers on barges. | Good..... | Aboard steamers by hand from barges; alongside steamers on barges. | Good..... | On cars at U. S. Engineer Depot, St. Louis. | |
| 17. Give brief description of method used by contractor in delivering coal. | Delivered at Vicksburg, Miss. Succeeded by Pittsburgh Coal Co. | | Delivered at Natchez, Miss. Succeeded by Pittsburgh Coal Co. | | Delivered at St. Louis, Mo. On U. S. barges, 15,000; alongside and aboard steamers, 5,000. Alongside, \$1.45; aboard steamers, \$1.70. | | Delivered at Greenville, Miss. Aboard, \$3.50; alongside, \$3.25. Aboard, \$3.378; alongside, \$3.067. | | | | | Delivered at St. Louis, Mo. | |

TABLE XXVII.—Coal purchased by the B. t. u. method during the calendar year ending Dec. 31, 1916—Continued.

| District..... | St. Louis, Mo., Mississippi River Commission. | | | | Third Mississippi River District. | | | |
|--|---|--|---|---|---|--|--|--|
| | West Kentucky Coal Co.
Apr. 7, 1916..... | West Kentucky Coal Co.
June 12, 1916..... | West Kentucky Coal Co.
Apr. 7, 1916..... | West Kentucky Coal Co.
Apr. 7, 1916..... | West Kentucky Coal Co.
Apr. 7, 1916..... | West Kentucky Coal Co.
Aug. 21, 1916..... | West Kentucky Coal Co.
Aug. 21, 1916..... | West Kentucky Coal Co.
Aug. 21, 1916..... |
| 1. Contractor..... | | | | | | | | |
| 2. Date of award of contract..... | 79.16..... | 57.28..... | 91.53 per cent of max. | 100 per cent. | 100 per cent. | About 44. | About 44. | About 44. |
| 3. Percentage of completion..... | | | | | | | | |
| 4. Name of mine..... | Mines Nos. 1, 2, 8, 9..... | Mine No. 7..... | Mines Nos. 1, 2, 8, 9..... | Mine No. 7..... | Mine No. 7..... | Mine No. 7..... | Mine No. 7..... | Mine No. 7..... |
| 5. Location of mine..... | Near Sturgis, Union Co., Ky. | Near Sturgis, Union Co., Ky. | Near Sturgis, Union Co., Ky. | Near Sturgis, Union Co., Ky. | Near Sturgis, Union Co., Ky. | Near Sturgis, Union Co., Ky. | Near Sturgis, Union Co., Ky. | Near Sturgis, Union Co., Ky. |
| 6. Name of coal..... | Tradewater. | Baker. | Tradewater. | Baker. | Tradewater. | Baker. | Tradewater. | Baker. |
| 7. Kind of coal..... | Bituminous; pea and slack. | Bituminous; screened lump. | Bituminous; screened lump. | Bituminous; screened lump. | Bituminous; screened lump. | Bituminous; screened lump. | Bituminous; screened lump. | Bituminous; screened lump. |
| 8. Amount of coal contracted for..... | 9,000..... | 9,000..... | 10,000..... | 10,000..... | 1,800..... | 10,000..... | 10,000..... | 10,000..... |
| (a) In long tons..... | | | | | | | | |
| (b) In short tons..... | | | | | | | | |
| 9. Analysis: | | | | | | | | |
| (a) Percentage of moisture (as delivered)..... | Per cent. 6.0 | Per cent. 3.4 | Per cent. 4.2 | Per cent. 4.0 | Per cent. 3.4 | Per cent. 4.1 | Per cent. 3.0 | Per cent. 4.26 |
| (b) Ash in dry coal..... | 12.0 | 13.82 | 10.4 | 10.0 | 7.0 | 8.4 | 9.0 | 11.26 |
| (c) Sulphur in dry coal..... | 3.5 | 4.12 | 1.20 | 3.0 | 1.5 | 1.05 | 2.5 | 1.64 |
| (d) Volatile matter..... | 35.0 | 36.79 | 35.7 | 35.0 | 35.0 | 36.4 | 35.0 | 52.37 |
| (e) B. t. u..... | 12,260 | 12,484 | 13,120 | 13,000 | 13,500 | 13,580 | 13,200 | 13,025 |
| 10. Price per 1,000 B. t. u..... | \$0.08405..... | \$0.099568..... | \$0.08373..... | \$0.08373..... | \$0.09453..... | \$0.09453..... | \$0.09453..... | \$0.09453..... |

FLOATING PLANT.

4767

| | Short tons. | Long tons. | Short tons. | Long tons. | Short tons. | Long tons. | Short tons. | Long tons. | Short tons. ¹ | Long tons. | |
|---|--|--|--|--|--|--|--|--|--|------------|--------|
| | (a) | b) | (c) | | | | | | (a) | b) | (c) |
| 11. Bidder's price per ton.. | \$1.66 | | | | | | | | \$2.75 | \$2.90 | \$3.00 |
| 12. Contract price per ton established by proposed. | \$2.074 | | | | | | | | 2.75 | 2.90 | 3.00 |
| 13. Average adjusted price per ton of coal as delivered. | \$1.9818 | | | | | | | | 2.713 | 2.857 | 2.928 |
| 14. Total amount paid to contractor during calendar year. | \$14,119.70 | | | | | | | | \$11,341.23 | | |
| 15. Total number of tons paid for during calendar year. | 7,124.72 | | | | | | | | 4,383.47 | | |
| 16. Remarks on coal as delivered. | (1)..... | (1)..... | (1)..... | (1)..... | (1)..... | (1)..... | (1)..... | (1)..... | Satisfactory. | | |
| 17. Give brief description of method used by contractor in delivering coal. | Remarks. | Remarks. | Remarks. | Remarks. | Remarks. | Remarks. | Remarks. | Remarks. | Delivery on contractor's barges of about 600 tons each. A small amount is delivered on fuel flats. | | |
| | ¹ Coal delivered in contractor's 600-ton barges on the Mississippi River below Cairo; mainly near Caruthersville, Mo. Barges were retained until coal was used. | ¹ Coal delivered in contractor's 600-ton barges on the Mississippi River below Cairo; mainly near Caruthersville, Mo. Barges were retained until coal was used. | ¹ Coal delivered in contractor's 600-ton barges on the Mississippi River below Cairo; mainly near Caruthersville, Mo. Barges were retained until coal was used. | ¹ Coal delivered in contractor's 600-ton barges on the Mississippi River below Cairo; mainly near Caruthersville, Mo. Barges were retained until coal was used. | ¹ Coal delivered in contractor's 600-ton barges on the Mississippi River below Cairo; mainly near Caruthersville, Mo. Barges were retained until coal was used. | ¹ Coal delivered in contractor's 600-ton barges on the Mississippi River below Cairo; mainly near Caruthersville, Mo. Barges were retained until coal was used. | ¹ Coal delivered in contractor's 600-ton barges on the Mississippi River below Cairo; mainly near Caruthersville, Mo. Barges were retained until coal was used. | ¹ Price for delivery on contractor's barges at mouth of White River, Greenville, and Vicksburg. A small additional charge is made if delivery is made in small quantities on board United States vessels.
(a) Price for delivery at mouth of White River.
(b) Price for delivery at Greenville, Miss.
(c) Price for delivery at Vicksburg, Miss. | | | |

TABLE XXVII.—Coal purchased by the B. t. u. method during the calendar year ending Dec. 31, 1916—Continued.

| District..... | Wilmington, Del. | | | | Wilmington, N. C. | | | |
|--|---|---|--|---|---|---------------|-------------------------------|--|
| | Hetherington & Co., Philadelphia, Pa.
July 27, 1915..... | McAllister Coal Co., Atlantic City, N. J.
July 15, 1916..... | Charles Warner Co.
Sept. 27, 1916, to July 18, 1916. | The C. G. Blake Co.
Aug. 24, 1916, to Oct. 28, 1916. | Smokeless Fuel Co.
Nov. 20, 1916. | | | |
| 1. Contractor..... | 100 per cent. | 50 per cent. | 50 per cent. | 100 per cent. | 100 per cent. | | | |
| 2. Date of award of contract..... | Vulcan No. 1 or Ladysmith. | Trout Run..... | Garrett County Coal & Mining Co.
Dodson, Md.
Warner No. 5. | Pax and Sugar Creek mines. | Pocahontas. | | | |
| 3. Percentage of completion..... | Houtzdale, Pa.
McShannon. | Cambria County, Pa.
Portage. | Bituminous. | New River country. | McDowell County, W. Va.
Pocahontas. | | | |
| 4. Name of mine..... | Bituminous. | Bituminous. | Bituminous. | Bituminous; run of mine. | Bituminous; run of mine. | | | |
| 5. Location of mine..... | 3,000..... | 3,000..... | 3,000 tons. | 1,910..... | 6,000..... | | | |
| 6. Name of coal..... | | | | | | | | |
| 7. Kind of coal..... | | | | | | | | |
| 8. Amount of coal contracted for:
(a) in long tons.....
(b) in short tons..... | | | | | | | | |
| 9. Analysis.
(a) Percentage of moisture (as delivered).
(b) Ash in dry coal.
(c) Sulphur in dry coal.
(d) Volatile matter.
(e) B. t. u..... | With bid. | | Average of Government's test. | | With bid. | | Average of Government's test. | |
| | Hetherington & Co. | McAllister Coal Co. | Hetherington & Co. | McAllister Coal Co. | | | | |
| | Per cent. 2.50 | Per cent. 3.00 | Per cent. 1.89 | Per cent. 1.57 | Per cent. 2.5 | Per cent. 2.1 | Per cent. 1.5 | |
| | 6.00 | 8.50 | 10.45 | 9.21 | 6.0 | 6.3 | 6.4 | |
| | 1.26 | 1.75 | 2.62 | 1.41 | 1.0 | .68 | .69 | |
| | 21.50 | 20.00 | 25.33 | 23.74 | 20.0 | 18.9 | 18.5 | |
| | 14,400 | 14,150 | 13,891 | 14,112 | 14,500 | 14,646 | 14,700 | |
| 10. Price per 1,000,000 B. t. u. | \$0.1146—Hetherington & Co.; \$0.123—McAllister..... | | \$0.1222..... | | \$0.117, \$0.126, \$0.191, \$0.207..... | | \$0.112, \$0.114, \$0.126. | |

| | Long tons, Hetherington & Co. | Long tons, McAllister Coal Co. | Long tons. | Short tons. | Short tons. |
|---|--|--|---------------------------------|---|---|
| 11. Bidder's price per ton. | \$4.23 | | | | |
| 12. Contract price per ton established by proposal. | \$4.23 | \$4.55 | \$3.95-\$4.25 | \$3.40, \$3.75, \$5.05, \$6.00 | \$3.30, \$3.65, \$3.75 |
| 13. Average adjusted price per ton of coal as delivered. | \$3.71 | \$4.55 | \$3.95-\$4.25 | \$3.40, \$3.75, \$5.05, \$6.00 | \$3.30, \$3.65, \$3.75 |
| 14. Total amount paid to contractor during calendar year. | \$3,572.16 | \$1,081.50 | \$4.0588 | \$3.39, \$3.805, \$5.049, \$6.1107 | \$3.214, \$3.495, \$3.022 |
| 15. Total number of tons paid for during calendar year. | 983.34 | 346.068 | \$7,497.12 | \$9,704.96 | \$15,023.37 |
| | | | 1,847.23 | | 3,903.98 |
| 16. Remarks on coal as delivered. | Hetherington's, fair; McAllister's excellent. | Good | | | Satisfactory. |
| 17. Give brief description of method used by contractor in delivering coal. | Delivered by teams to dredge. | Delivered to dredge by scows | | Car-load lots, as ordered, cars of about 50 tons. | Car-load lots, as ordered, cars of about 50 tons. |
| | <i>Remarks.</i>
Dredge "Abscon" moved from Abscon Inlet, N. J., to Cold Spring Inlet, N. J., Aug. 14, 1916, and while at Cold Spring Inlet 570,403 long tons of coal were purchased of the McAllister Coal Co., Atlantic City, N. J., in open market, as it was impracticable to make contract owing to temporary character of the work at Cold Spring Inlet, N. J. Thirty (30) long tons were purchased in open market of the Charles Warner Co., Wilmington, Del., while dredge was undergoing repairs there. | <i>Remarks.</i>
The coal purchased in open market was 41 tons at \$3.27 per ton, total of \$14.07 from the Sterling Coal Co., of Philadelphia, Pa. This coal was purchased and delivered to dredge while in dry dock in Philadelphia, Pa. | | | |
| | | | Refers to the contract of 1915. | | |

TABLE XXVII.—Coal purchased by the B. t. u. method during the calendar year ending Dec. 31, 1916—Continued.

| District..... | Wilmington, N. C. | | | | | | | | | |
|--|--|--|---|---|-----------|-----------|-----------|-----------|-----------|--------|
| 1. Contractor..... | Maryland Coal & Coke Co..... | The Springer Coal Co..... | Crozer-Pocahontas Co..... | Jas. W. Thompson. | | | | | | |
| 2. Date of award of contract..... | Apr. 24, 1916; May 25, 1916; June 26, 1916; July 27, 1916. | Jan. 26, 1916; Feb. 21, 1916; Mar. 28, 1916; Aug. 24, 1916. | Sept. 29, 1916. | July 28, 1916. | | | | | | |
| 3. Percentage of completion..... | 100 per cent. | 100 per cent. | 100 per cent. | 100 per cent. | | | | | | |
| 4. Name of mine..... | Pocahontas. | Sun, Eccles, Thurmond, Pas- | Pocahontas district on N. & W. | Pocahontas. | | | | | | |
| 5. Location of mine..... | Stanford, Raleigh County, W. Va. | ton, Coaldale, and Elkhorn Counties, W. Va. | R. R., McDowell County, W. Va. | Pocahontas. | | | | | | |
| 6. Name of coal..... | Pocahontas | Pocahontas | Pocahontas. | Pocahontas. | | | | | | |
| 7. Kind of coal..... | Bituminous (run of mine). | Bituminous (run of mine). | Bituminous (run of mine). | Bituminous (run of mine). | | | | | | |
| 8. Amount of coal contracted for: | | | | | | | | | | |
| (a) In long tons..... | 1,300. | 1,560. | 350. | 250. | | | | | | |
| (b) In short tons..... | | | | | | | | | | |
| 9. Analysis: | | | | | | | | | | |
| (a) Percentage of moisture (as delivered)..... | 2.5 | 2.5 | 2.5 | 2.5 | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | |
| (b) Ash in dry coal..... | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 1.2 |
| (c) Sulphur in dry coal..... | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 8.1 |
| (d) Volatile matter..... | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 | 7.5 |
| (e) British thermal unit..... | 14,500 | 14,500 | 14,500 | 14,500 | 14,500 | 14,500 | 14,500 | 14,500 | 14,500 | 14,350 |
| 10. Price per 1,000,000 British thermal unit..... | \$0.118, \$0.118, \$0.125, \$0.125, \$0.125, \$0.137. | \$0.115, \$0.126, \$0.131, \$0.151. | \$0.136, \$0.147. | \$0.127. | | | | | | |
| 11. Bidder's price per ton..... | Short tons. Long tons. | Short tons. Long tons. | Short tons. Long tons. | Short tons. Long tons. | | | | | | |
| 12. Contract price per ton established by proposal..... | { \$3.43, \$3.44, \$3.62 }
{ \$3.63, \$3.64, \$3.78 }
{ \$3.43, \$3.41, \$3.62 } | { \$3.43, \$3.65 }
{ \$3.80, \$4.40 }
{ \$3.43, \$3.65 } | { \$3.95, \$4.30 }
{ \$3.95, \$4.30 } | { \$3.69 }
{ \$3.69 } | | | | | | |
| 13. A average adjusted price per ton of coal as delivered..... | { \$3.44, \$3.43, \$3.62 }
{ \$3.72, \$3.73, \$3.79 } | { \$3.43, \$3.72 }
{ \$3.96, \$4.40 } | { \$3.95, \$4.37 }
{ \$1,039.66 } | { \$3.65 }
{ \$976.28 } | | | | | | |
| 14. Total amount paid to contractor during calendar year..... | \$5,926.27 | \$6,041.90 | \$1,039.66 | \$976.28 | | | | | | |
| 15. Remarks on coal as delivered..... | 1,040.00 | 1,198.28 | 345.35 | 267.04 | | | | | | |
| 17. A brief description of method used by contractor in delivering coal..... | Car load lots, as ordered, cars of about 60 tons. | Car load lots, as ordered, cars of about 60 tons. | Car load lots, as ordered, cars of about 80 tons. | Car load lots, as ordered, cars of about 60 tons. | | | | | | |

TABLE XXVIII.

WRECK REMOVED OR BEING REMOVED.

4771

TABLE XXVIII.—Wrecks removed during the calendar year ending Dec. 31, 1916.

| District | Baltimore, Md. | | | Boston, Mass. |
|--|--|--|---------------------------|--|
| 1. Location | Savertown River, Md. | Crisfield Harbor, Md. | Curtis Bay, Md. | Boston Harbor, Mass. |
| 2. Depth of water | 9 feet | 64 feet | 20 feet | 35 feet at mean low water. |
| 3. Contractor | Fred Johnson Wrecking Co., Baltimore, Md. | Crisfield Sand & Dredging Co., Crisfield, Md. | Baltimore Wrecking Co. | The T. A. Scott Co. |
| 4. Date of award of contract | June 30, 1916 | Oct. 11, 1916 | Oct. 23, 1916 | Sept. 30, 1916. |
| 5. Probable date of completion | Completed | Completed | Completed | Oct. 7, 1916. |
| 6. Amount of contract | \$440 | \$250 | \$520 | \$608 |
| 7. Method of removal | Raising by derrick | Blasting and raising with derrick | Raising by derrick | Removed entire. |
| 8. Type of vessel and material of hull | 2-masted wooden hull schooner. | 2-masted wooden hull schooner. | Open-deck scow. | Schooner with wooden hull. |
| 9. Length of vessel | 60.8 feet | 64.9 feet | 91 feet | 88 feet. |
| 10. Approximate value of vessel | Unknown. | Unknown. | Unknown. | \$1,500. |
| 11. Name of vessel | William E. Price | Andrew K. Shriver | Scow No. 6. | Marguerite. |
| 12. Brief description of contractor's plant. | Derrick scow, launch, tug-boat, crew of 6 men. | Derrick and deck scow, launch, tow boats, crew of 4 men. | Derrick wrecking machine. | See remarks. |
| | | | | Remarks.
Scow lighter Admiral attended by 3 harbor tugs. Lighter, 100 feet long, 40 feet breadth, draws 12 feet at low water and 2 feet forward when light. Derrick capable of lifting 75 tons. |

| District..... | Charleston, S. C. | Detroit, Mich. | Duluth, Minn. | Jacksonville, Fla. |
|---|--|---|--|---|
| 1. Location..... | Ashley River, S. C. | Detroit River near Mam-
juda Island. | Duluth-Superior Harbor | St. Johns River 1. |
| 2. Depth of water..... | 6 feet. | About 25 feet. | 20 feet. | 32 feet. |
| 3. Contractor..... | Work done by hired labor. | Raid Wrecking Co. | Whitney Bros. Co. | (a). |
| 4. Date of award of con-
tract. | Commenced May 16, 1916. | May 20, 1916. | Mar. 31, 1916. | (b). |
| 5. Probable date of com-
pletion. | Completed May 29, 1916. | June 10, 1916. | 2 weeks. | Completed. |
| 6. Amount of contract. | Cost, \$1,435.23. | Title to wreck and cargo. | \$200. | (c). |
| 7. Method of removal. | (1). | By cofferdam and pumping
out. | Lifted by floating derrick
scow and towed to place
of disposal. | (d). |
| 8. Type of vessel and ma-
terial of hull. | Motor freight boat; wood. | Wooden schooner. | Small steam fishing tug;
wood. | Schooner; wood. |
| 9. Length of vessel. | 58.3 feet. | 182 feet. | 94.8 feet. | 43 feet. |
| 10. Approximate value of
vessel. | None. | Unknown. | \$1,500. | No data. |
| 11. Name of vessel. | Oakland. | Melvin S. Bacon. | Searchlight. | Nellie Grant. |
| 12. Brief description of con-
tractor's plant. | (1). | Tug, lighter, and complete
wrecking outfit. | Floating steam derrick. | None. |
| | Remarks.
1 The removal was accom-
plished by cutting up wreck
with dynamite, raising the
parts by U. S. snagboat
Wataree and depositing the
same on marsh land on the
western bank of Ashley
River, and burning wooden
parts.
2 U. S. snagboat Wataree,
U. S. launch Dawho, 1
lighter, 1 diver, and neces-
sary explosives. | Remarks.
Raising and removal of
wreck completed June 10,
1916. | Remarks.
1 Abandoned lighter
grounded near Browns Creek,
about 10 miles above the
mouth of the river.
2 The lighter was broken
into small pieces with dynamite by hired labor and Gov-
ernment boats. | Remarks.
1 Wreck occurred on the
north reef of the bar at Boca
Grande, in Charlotte Harbor,
Fla., in 1915; later drifted
over the reef into the middle
of channel, from where it was
removed.
2 All bids were rejected as
being too high, and work was
done by United States and
hired labor.
3 The wreck was removed
May 9 and 10, 1916.
4 Cost \$304.97.
5 Placing and exploding
charges of 60 per cent dynamite varying from 10 to 25
pounds each, where frag-
ments of the wreck projected
above the sandy bottom. |

TABLE XXVIII.—Wrecks removed during the calendar year ending Dec. 31, 1916—Continued.

| District..... | Jacksonville, Fla. | Milwaukee, Wis. | Mobile, Ala. |
|--|---|---|---|
| 1. Location..... | Southwest entrance to Tampa Bay, Fla. | Fox River, Oshkosh, Wis.... | Pascagoula Ship Channel, Miss. |
| 2. Depth of water..... | 17 feet..... | 10 feet..... | 13 feet. |
| 3. Contractor..... | Edwards Construction Co. | Hired labor..... | United States plant and hired labor. |
| 4. Date of award of contract..... | Oct. 10, 1916..... | Completed..... | Feb. 12, 1916. ¹ |
| 5. Probable date of completion..... | Completed..... | Completed..... | Feb. 19, 1916. |
| 6. Amount of contract..... | \$1,350..... | Removed by hired labor and Government plant. | \$104 79. ² |
| 7. Method of removal..... | By contract. ¹ | Slide-wheel steamer; wood..... | Explosive and derrick barge. |
| 8. Type of vessel and material of hull..... | Screw propeller, steam, passenger and freight; wood. | Decked lighter; wood..... | Barge; wood. |
| 9. Length of vessel..... | 90.5 feet..... | 90 feet..... | About 90 feet. |
| 10. Approximate value of vessel..... | Of no value..... | \$500..... | Worthless. |
| 11. Name of vessel..... | Abandoned wooden lighter..... | Fremont..... | Barge No. 28, belonging to this district. |
| 12. Brief description of contractor's plant..... | Mildred..... | (¹)..... | (¹)..... |
| | Remarks.
¹ The machinery was removed by divers and derrick barge, the remaining wreckage was then dynamited and the pieces placed on shore.
² A combination pile-driver and derrick barge, lifting capacity about 15 tons; 1 barge for storing wreckage and 2 tugs. Crew consisted of 1 foreman, 4 boatmen, 2 divers, 2 launch crews. | Remarks.
Steamer sank at dock of Chicago & North Western Railway Co., Oshkosh, Wis., and was abandoned by the owner. | Remarks.
¹ Date of commencement.
² Total cost.
³ Temporary derrick rigged on coal barge with use of alling chains and snagging hooks. |

| District..... | Mobile, Ala. | Montgomery, Ala. | New London, Conn. | Mississippi River, fourth. | Newport, R. I. |
|--|---|--|---|------------------------------------|---|
| 1. Location..... | Mobile Ship Channel, turning basin. | Bainbridge, Ga. A..... | Long Island Sound, off Plum Island Light, N. Y. | Below naval dock, Algiers..... | Nantucket Sound, about 24 miles (2500') from Hand-Ferriol Light Vessel. |
| 2. Depth of water..... | 28 feet. | 6 feet mean low water..... | 10 feet. | 50 feet..... | 40 feet. |
| 3. Contractor..... | United States plant and hired labor. | United States, by hired labor. | C. W. Johnston..... | B. D. Wood & Bros..... | Eugene Boehm. |
| 4. Date of award of contract..... | Nov. 6, 1916. | None..... | Oct. 30, 1916..... | Nov. 16, 1915..... | Jan. 28, 1916 (date of contract). |
| 5. Probable date of completion..... | Nov. 6, 1916. | do..... | Completed Nov. 16, 1916..... | Completed..... | Completed Apr. 11, 1916. |
| 6. Amount of contract..... | \$71. | do..... | \$645. | \$7,985. | \$5,222. |
| 7. Method of removal..... | Snagboat Demopolis..... | By U. S. dredge Upatoi..... | Wreck blown up by dynamite and material placed ashore above high water. | Blasting and removal of debris. | Destroyed by dynamite. |
| 8. Type of vessel and material of hull..... | Launch; wood. | Stern-wheel steamer; wood. | Wreck blown up by dynamite and material placed ashore above high water. | Sailing: steel. | Steam tug; steel hull. |
| 9. Length of vessel..... | 30 feet. | Approximately 100 feet. | Not known. | 197 feet 5 inches. | 137.1 feet. |
| 10. Approximate value of vessel..... | Worthless. | None. | No value. | \$40,000. | Unknown. |
| 11. Name of vessel..... | Not known. | Calhoun. | Thomas J. Horan. | Santos Amarel..... | Iachawama. |
| 12. Brief description of contractor's plant. | U. S. snagboat Demopolis..... | U. S. dipper dredge Upatoi. | None, other than power launch and team. | Divers' outfit and material barge. | Auxiliary schooner, diving outfit, explosives. |
| | <i>Remarks.</i>
1. Date of commencement.
2. Total cost. | <i>Remarks.</i>
On Dec. 23, 1915, an allotment of \$700 was made for the removal of the wreck of the steamer Calhoun from the Flint River, Ga. (E. D. 90826, Dec. 22, 1915). On Feb. 5, 1916, the dipper dredge Upatoi left Winding Shoals for Bainbridge, Ga., arriving on Feb. 8. She commenced operations on Feb. 9 and completed the work on Feb. 12. The total amount of the allotment was expended. | | | |

| First New York. | | | | | | | | | | | |
|--|-------------------------|---|--|---------------------|---|--|--|--|--|--|--|
| District..... | North River, N. Y. | Hudson River below New Baltimore, N. Y. | Whitehall Harbor, N. Y. | Pelham Bay, N. Y. | Hudson River, foot of Essex St., Jersey City, N. J. | | | | | | |
| 1. Location..... | 50 feet. | 7 feet. | 12 feet. | 8 feet. | 8 feet. | | | | | | |
| 2. Depth of water..... | Chas. W. Johnston. | John P. Randerson. | Lake Champlain Transportation Co. | Baxter Wrecking Co. | Baxter Wrecking Co. | | | | | | |
| 3. Contractor..... | Feb. 18, 1916. | Apr. 20, 1916. | Oct. 12, 1916. | June 23, 1916. | Oct. 21, 1916. | | | | | | |
| 4. Date of award of contract. | Completed Apr. 6, 1916. | Apr. 28, 1916. | Oct. 31, 1916. | July 1, 1916. | Oct. 25, 1916, completed. | | | | | | |
| 5. Probable date of completion. | \$3,375. | \$839. | \$95. | \$391. | \$975. | | | | | | |
| 6. Amount of contract. | Blasting and dredging. | Broken up, partly placed on shore, partly buried behind dike. | Raised, towed to, and anchored in South Bay. | Tug. | Tug. | | | | | | |
| 7. Method of removal. | Barge, wood. | Scow, wood. | Canal boat, wood. | Sloop, wood. | Portion of deck scow; wood. | | | | | | |
| 8. Type of vessel and material of hull. | 113 feet. | About 85 feet. | 98 feet. | 49 feet. | 50 feet. | | | | | | |
| 9. Length of vessel. | None. | \$500. | Unknown. | None. | None. | | | | | | |
| 10. Approximate value of vessel. | St. Gabriel. | Jupiter or Davis No. 8. | A. G. Perham. | Comet. | Frank. | | | | | | |
| 11. Name of vessel. | Bucket dredge. | 1 dipper dredge, 2 cargo scows. | Tug boats. | Tug. | Tug and 2 pontoons. | | | | | | |
| 12. Brief description of contractor's plant. | | | | | | | | | | | |

TABLE XXVIII.—*Wrecks removed during the calendar year ending Dec. 31, 1916—Continued.*

| District | First New York | | Second New York | |
|---|--------------------------|--|-----------------------------|---|
| | East River, N. Y. | | Gravesend Bay | Pier 14, East River and 60th Street, Bay Ridge. |
| 1. Location | East River, N. Y. | | Gravesend Bay | Pier 14, East River and 60th Street, Bay Ridge. |
| 2. Depth of water | | | 13 feet. | |
| 3. Contractor | Baxter Wrecking Co. | | Merritt & Chapman Co. | |
| 4. Date of award of contract | Oct. 30, 1916. | | May 16, 1916. | |
| 5. Probable date of completion | Completed Nov. 21, 1916. | | Removed May 25, 1916. | June 12, 1916. |
| 6. Amount of contract | \$200. | | \$487, less \$1. | \$200. |
| 7. Method of removal | Tug. | | Raised by derrick lighters. | Beached, Barron Island. |
| 8. Type of vessel and material | Canal boat; wood. | | Coal barge; wood. | Canal boat; wood. |
| 9. Length of vessel | 90 feet. | | 86 feet. | 100 feet. |
| 10. Approximate value of vessel | None. | | None. | None. |
| 11. Name of vessel | Unknown. | | Andromeda | James Mooney. |
| 12. Brief description of contractor's plant | Tug and derrick boat. | | Derrick lighter, tug, etc. | Steamer Manatee |

| Second New York. | | | | | |
|---|---|--|---|--|-------------------------------------|
| District..... | East Rockaway Inlet..... | Orowoo Creek..... | Picked up in Ambrose Chan-
nel..... | Beach at Fort Wadsworth..... | Gravesend Bay. |
| 1. Location..... | 6 feet..... | 4 feet..... | | 3 feet..... | 3 feet. |
| 2. Depth of water..... | Both & Weston..... | P. F. Meisner..... | | | |
| 3. Contractor..... | June 2, 1916..... | Aug. 14, 1916..... | | | |
| 4. Date of award of con-
tract..... | July 31, 1916 (completed)..... | Aug. 12, 1916 (completed)..... | Aug. 23, 1916, beached, Bar-
ren Island..... | Drifted ashore at Wads-
worth, Aug. 29..... | Sept. 6, beached, Gravesend
Bay. |
| 5. Probable date of com-
pletion..... | \$1,275, less \$25..... | \$294, less \$1..... | Cost of removal, \$162.18..... | | |
| 6. Amount of contract..... | Broken up by blasting; dis-
posed of above high-water
line..... | Broken up by dredge;
wreckage burned..... | Run ashore on beach..... | Broken up on beach..... | Put on beach. |
| 7. Method of removal..... | Schooner; wood..... | Sloop; wood..... | Canal boat; wood..... | Canal boat; wood..... | Canal boat; wood. |
| 8. Type of vessel and ma-
terial of hull..... | 145 feet..... | 46 feet..... | 100 feet..... | 100 feet..... | 100 feet. |
| 9. Length of vessel..... | None..... | None..... | None..... | None..... | None. |
| 10. Approximate value of
vessel..... | Arlington..... | Alcoa..... | Joseph F. Kennedy..... | Not known..... | L. W. Beecher. |
| 11. Name of vessel..... | Small floating derrick, row-
boat, and blasting outfit..... | Small dredge with 14 cubic
yard orange-peel bucket..... | U. S. Survey boat Manissee..... | | Survey boat Manissee. |
| 12. Brief description of
contractor's plant..... | | | | | |

TABLE XXVIII.—*Wrecks removed during the calendar year ending Dec. 31, 1916—Continued.*

| District..... | Second New York. | | | | | |
|--|--------------------------------|---------------------------------------|------------------------------------|--|---------------------------------|------------------------------------|
| | Gowanus Canal..... | Gravesend Bay..... | Clifton, Staten Island..... | Foot Clinton Street, Gowanus Creek..... | Picked up in Kill Van Kull..... | |
| 1. Location..... | 3 feet..... | 2 feet..... | 3 feet..... | 3 feet..... | | |
| 2. Depth of water..... | Taken by Manlees, Sept. 1..... | | | | | |
| 3. Contractor..... | | | | | | |
| 4. Date of award of contract..... | Beached Sept. 11, 1916..... | Sept. 11, beached Sandy Hook Bay..... | Sept. 20, put ashore, Clifton..... | Oct. 5, beached at Clifton, Staten Island..... | | |
| 5. Probable date of completion..... | Run up on beach, Camp Low..... | Run up on beach..... | Put on beach..... | Beached..... | | Oct. 12, 1916. |
| 6. Amount of contract..... | Canal boat; wood..... | Canal boat; wood..... | Canal boat; wood..... | Canal boat; wood..... | | Beached at Clifton, Staten Island. |
| 7. Method of removal..... | 100 feet..... | 100 feet..... | 100 feet..... | 100 feet..... | | Canal boat; wood. |
| 8. Type of vessel and material of hull..... | None..... | None..... | None..... | None..... | | 100 feet. |
| 9. Length of vessel..... | J. H. Neville..... | Olive..... | Limerick Levick..... | John Arnold..... | | None. |
| 10. Approximate value of vessel..... | U. S. steamer Manlees..... | U. S. steamer Manlees..... | Manlees..... | Survey boat Manlees..... | | Not known. |
| 11. Name of vessel..... | | | | | | Survey boat Manlees. |
| 12. Brief description of contractor's plant..... | | | | | | |

| Third New York. | | | | | | | | | | | |
|--|---|---|---|--|--|---|--|--|--|--|--|
| District..... | Location..... | Atlantic Ocean, 14 miles off Highlands, N. J. | Elizabeth River, Baltio Street, Elizabeth, N. J. | Passaic River, N. J., at Kearny. | Overpeck Creek, N. J., 400 feet west Bergen turnpike bridge. | Raritan Railroad, across south draw opening of county bridge between Perth Amboy and South Amboy. | | | | | |
| 1. Location..... | | | | | | | | | | | |
| 2. Depth of water..... | 5 to 6 fathoms of water..... | 2 to 4 feet mean low water.... | 0 to 8 feet at mean low water.... | Quinn & Bailey..... | 1 to 6 feet, mean low water.... | 25 feet of water at mean low water. | | | | | |
| 3. Contractor..... | Destroyed by U. S. Coast Guard. | Hudson River Lighterage Co. | Quinn & Bailey..... | New York Submarine Constructing Co. (Inc.). ¹ | Baxter Wrecking Co. | | | | | | |
| 4. Date of award of contract..... | Cooperation of U. S. Coast Guard, requested on Feb. 19, 1916. | Order given Aug. 20, 1915, for removal. | May 25, 1915..... | Completed June 5, 1916 (original time limit waived). | Aug. 1, 1916..... | Sept. 15, 1916. | | | | | |
| 5. Probable date of completion..... | Wreck destroyed on Mar. 10, 1916. | Completed May 15, 1916..... | Completed June 5, 1916 (original time limit waived). | Completed Sept. 19, 1916..... | Completed Oct. 14, 1916. | | | | | | |
| 6. Amount of contract..... | \$493.84 charged by U. S. Coast Guard for removal of wreck. | \$215..... | \$987..... | \$900..... | \$1,000. | | | | | | |
| 7. Method of removal..... | Blown up with dynamite..... | Placed on meadow land near by and disposed of by burning. | Placed on land near by shoreward of bulkhead line. | Placed on shore near by to be broken up. | Raised and taken to contractor's yard at Weehawken and deposited beyond bulkhead line. | Wooden canal barge. | | | | | |
| 8. Type of vessel and material of hull. | Wooden 3-masted schooner..... | Wooden canal boat..... | Two wooden boats, viz., a canal boat and hull of an old schooner. | Two wooden boats, viz., old steam canal boat and canal boat. | Each 96 feet long..... | 105 feet. | | | | | |
| 9. Length of vessel..... | 170.7 feet..... | 70 feet..... | Canal boat, 95 feet; schooner, 110 feet. | Worthless..... | Worthless..... | Worthless. | | | | | |
| 10. Approximate value of vessel..... | Worthless..... | Worthless..... | Unamed..... | Unamed..... | Canal Boat Earl Hawley and steam canal boat Arthur D. Bissell. | Esther A. Tucker. | | | | | |
| 11. Name of vessel..... | John Bossert..... | Unamed..... | Small derrick scow with usual appurtenances. | Small derrick with centrifugal pump. | Small derrick scow with pump and usual appurtenances. | Steam derrick equipped with pumps and pontoons. | | | | | |
| 12. Brief description of contractor's plant..... | (¹)..... | | | | | | | | | | |
| | Remarks. | | | | | | | | | | |
| | ¹ The wreck was blown up by the commanding officer with Coast Guard cutter Mohawk, acting under orders issued by Capt. Dunwoody, division commander, New York Division, U. S. Coast Guard. | | | | | | | | | | |
| | | ¹ Contract with Robert R. Fox for removing these wrecks, dated Nov. 30, 1915, was annulled on June 28, 1916. | | | | | | | | | |

TABLE XXVIII.—*Wrecks removed during the calendar year ending Dec. 31, 1916—Continued.*

| District..... | New York, N. Y., third. | Philadelphia, Pa. | Portland, Me. | First, San Francisco, Cal. |
|--|---|---|---|---|
| 1. Location..... | Atlantic Ocean, about 3 miles off Sandy Hook, N. J. | Delaware Bay, Del., near Ship John Light. | Coresa Harbor, Me..... | San Francisco Bay, Cal. |
| 2. Depth of water..... | About 14 feet of water. | 15 feet at mean low water. | 13 feet..... | 21 feet at mean low water. |
| 3. Contractor..... | Destroyed by U. S. Coast Guard. | Eugene Boehm..... | Work was done with hired plant and labor. | Melvin A. Taylor. |
| 4. Date of award of contract..... | Cooperation of U. S. Coast Guard requested on Oct. 26, 1916. | Apr. 24, 1916..... | Work was started Oct. 23, 1916. | Jan. 31, 1916. |
| 5. Probable date of completion..... | Wreck destroyed Oct. 31, 1916. | May 22, 1916..... | Completed Nov. 1, 1916..... | Completed Aug. 5, 1916. |
| 6. Amount of contract..... | \$15.82 charged by U. S. Coast Guard for removal of this wreck. | \$463..... | Day work..... | \$9,280. |
| 7. Method of removal..... | Blown up with dynamite. | Blasting and towing heavy pieces ashore. | The wreck was broken up with dynamite and the pieces taken up by a lighter and deposited on shore. | Bulkhead around sides and pumped out enough water to float it. |
| 8. Type of vessel and material of hull..... | Wooden 2-masted schooner. | Schooner, wood..... | 2-masted schooner, spruce wood. | Passenger steamer converted into coal barge; iron hull. |
| 9. Length of vessel..... | 100.3 feet. | 44 feet..... | Approximately 100 feet. | 250 feet. |
| 10. Approximate value of vessel..... | Worthless. | No value..... | None..... | \$8,000 when wrecked. |
| 11. Name of vessel..... | J. R. Bodwell. | Carrie Haley. | Oricle. | City of Panama. |
| 12. Brief description of contractor's plant..... | (1)..... | Gasoline launch and row-boat, equipped for blasting and sweeping. | (1)..... | Derrick barge and donkey engine, gasoline launch, 2 small steam engines, and 3 centrifugal pumps. |
| | Remarks.
The wreck was blown up by the commanding officer with Coast Guard cutter Mohawk, acting under orders issued by Capt. Dunwoody, district commander, New York division, U. S. Coast Guard. | Remarks.
The schooner was built in 1885, and sank on Nov. 19, 1915. | Remarks.
1 A diver with gear and helpers was employed for 9 days. Motor boat Alpha, 40 feet long, by 9 beam, 2.5 feet draft, 2-cylinder, 4-horsepower, 2-cycle Knox, 6 horsepower, 1-cylinder Atlas, 40 by 36, depth, 7.1; draft, 7 to 9 feet; 120 const. net; 2 steel plates compound and 81 by 15 by 14; 2 Roberts water-tube boilers, No. 13; Lambert hoisting engines, 84 by 10; beam derrick, 10 feet; 20 coils at deck.
The work cost \$400. | |

| District | | Washington, D. C. | | Wilmington, Del. | |
|--|---|--|---|--|---|
| 1. Location..... | Potomac River..... | Mattaponi River..... | Mattawoman Creek..... | About 1/2 mile off shore above Barnegat Inlet, N. J.
About 9 feet at low water.
None; work done by this office employing day laborers. | South mouth of Double Creek, N. J.
4 foot water at low tide.
None; work done by this office employing day laborers. |
| 2. Depth of water..... | 59 feet..... | 10 feet..... | 10 feet..... | | |
| 3. Contractor..... | | | | | |
| 4. Date of award of contract..... | Completed Jan. 31, 1916..... | Completed Apr. 25, 1916..... | Completed June 5, 1916..... | Feb. 10, 1916..... | Feb. 6, 1916..... |
| 5. Probable date of completion..... | | | | | |
| 6. Amount of contract..... | | | | | |
| 7. Method of removal..... | Blasting..... | Blasting and removing pieces with derrick. Wooden barge..... | Blasting and removing pieces with derrick. Three old wooden sailing vessels.
Not known.
No value. | By the use of explosives.
Italian bark; iron hull.
Approximately 200 feet.
Not known. | By the use of explosives.
Wooden hay scow.
About 50 feet.
Probably \$250. |
| 8. Type of vessel and material of hull..... | Wooden sailboat..... | | | | |
| 9. Length of vessel..... | 55 feet..... | 123 feet..... | Not known. | | |
| 10. Approximate value of vessel..... | \$1,000..... | \$6,000..... | U. S. snag boat York (see Table VII). | Caterina..... | No name. |
| 11. Name of vessel..... | F. P. Coleman..... | Laurie V. Grove..... | U. S. snag boat York (see Table VII). | | |
| 12. Brief description of contractor's plant..... | | | | | |
| | Remarks.
The mast and rigging were blown off at deck. The hull was left; sufficient water was over it. Cost of removal was \$50. | Remarks.
Cost of removal was \$1,200. | Remarks.
Cost of removal was \$1,061.08. | | |

TABLE XXVIII.—Wrecks removed during the calendar year ending Dec. 31, 1916—Continued.

| District..... | | Wilmington, Del. | | | | | | | | | |
|--|--|---|---|---|---|--|--|--|--|--|--|
| 1. Location..... | | Blackbird Creek, Del..... | 6 miles south-southeast of Hog Island Coast Guard Station, Va..... | 219° 30', 14.8 miles from Winterquarter Lightship, coast of Virginia..... | Blackfish Bank, off Assateague Light, coast of Virginia..... | Wilmington Harbor, Christians River, Del..... | | | | | |
| 2. Depth of water..... | | 5 to 6 feet at mean low tide | About 20 feet..... | None; work done by this | 24 feet at low tide..... | 6 to 10 feet at low water. | | | | | |
| 3. Contractor..... | | None; work done by this office, employing day laborers. | None; broken up and scattered by natural elements. Bowsprit removed by Coast Guard cutter Onondaga. | None; work done by this office, employing day laborers. | None; work done by this office, employing day laborers. | Fred Kraemer, Philadelphia, Pa. | | | | | |
| 4. Date of award of contract..... | | | | | | Oct. 20, 1916. | | | | | |
| 5. Probable date of completion..... | | Apr. 7, 1916..... | Apr. 27, 1916..... | June 20, 1916..... | Oct. 7, 1916..... | Oct. 28, 1916. | | | | | |
| 6. Amount of contract..... | | | | | | \$1,000 less \$200 to be paid to United States for the vessel. | | | | | |
| 7. Method of removal..... | | By the use of explosives..... | See above..... | By the use of explosives..... | By the use of explosives..... | Lifting by derrick scows and pumping out hull. | | | | | |
| 8. Type of vessel and material of hull..... | | Wooden schooner..... | Wooden schooner-berge..... | Wooden schooner..... | Steel steamship..... | Wooden steamer. | | | | | |
| 9. Length of vessel..... | | 80 feet..... | 125.9 feet..... | 174.9 feet..... | 246 feet..... | 62.3 feet. | | | | | |
| 10. Approximate value of vessel..... | | Not known..... | Probably \$3,000..... | Probably \$250,000 at time of her loss. | Probably \$1,000,000 at one time. Her value at time of loss can not well be determined. | About \$1,000. | | | | | |
| 11. Name of vessel..... | | Diamond State..... | N. H. Burrow..... | Emma F. Angell..... | Treacrell..... | Massapequa. | | | | | |
| 12. Brief description of contractor's plant..... | | | | | | 2 large derrick scows and pumps and diver. | | | | | |

| District..... | | | | Wilmington, Del. | |
|--|---|---|---|--|--|
| 1. Location..... | Maurice River, N. J..... | Directly off shore from Ship Bottom Coast Guard Station, N. J., 8½ miles..... | Pennamun Creek, N. J..... | Abreast northern entrance to Hog Island Inlet, Va. | |
| 2. Depth of water..... | 5 to 8 feet at low water..... | About 10 fathoms..... | 2 to 4 feet at low water..... | About 18 feet at low water. | |
| 3. Contractor..... | None; work done by this office, employing day laborers. | None..... | None; work done by this office, employing day laborers. | None; it is proposed to remove this obstruction by hired labor. | |
| 4. Date of award of contract..... | Nov. 10, 1916..... | Dec. 8, 1916..... | Dec. 16, 1916..... | Not known. | |
| 5. Probable date of completion..... | By the use of explosives..... | Broken up and scattered by elements, masts removed by Coast Guard cutter Seneca and towed to shore. | By the use of explosives..... | It is proposed to use explosives in removing this vessel. | |
| 6. Amount of removal..... | By the use of explosives..... | Wooden schooner..... | Wooden tugboat..... | Iron steamer. | |
| 7. Type of vessel and material of hull..... | Wooden deck lighter..... | 192 feet..... | 43.5 feet..... | Not known. | |
| 8. Length of vessel..... | 80 feet..... | Probably \$3,000 at time of her loss. | Probably \$3,000 at time of her loss. | Not known; she was a Spanish steamer and foundered about 20 years ago. | |
| 9. Approximate value of vessel..... | About \$600..... | Tunkhannock..... | J. S. Lamon..... | Reported to be Albana. | |
| 10. Name of vessel..... | No name..... | | | | |
| 11. Name of vessel..... | | | | | |
| 12. Brief description of contractor's plant..... | | | | | |

TABLE XXVIII.—Wrecks removed during the calendar year ending Dec. 31, 1916—Continued.

| District..... | | Wilmington, Del. | |
|--|--|---|--|
| 1. Location..... | West by southwest of whistling buoy off Brigantine Shoals, N. J. | Turners Lump, off Assateague Light, Va. | 5-fathom bank shoal off lower coast of New Jersey. |
| 2. Depth of water..... | Not reported | 32 feet at low water..... | About 25 feet at mean low water. |
| 3. Contractor..... | None. See Remarks. | None..... | None. |
| 4. Date of award of contract..... | See Remarks. | Broken up and scattered by natural elements. | Broken up and scattered by natural elements. |
| 5. Probable date of completion..... | Not known..... | Wooden schooner-barge..... | Wooden schooner-barge. |
| 6. Amount of contract..... | do..... | 186.5 feet..... | 247.3 feet. |
| 7. Method of removal..... | do..... | Schnykill..... | Probably \$3,500. |
| 8. Type of vessel and material of hull..... | do..... | | Alex Gibson. |
| 9. Length of vessel..... | do..... | | |
| 10. Approximate value of vessel..... | do..... | | |
| 11. Name of vessel..... | do..... | | |
| 12. Brief description of contractor's plant..... | do..... | | |
| | | Remarks. | |
| | | <p>This obstruction was reported Feb. 23, 1916, by Mr. John L. Bailey, of Atlantic City, N. J., as floating bottom up at above location and as being probably anchored. The commander of the Coast Guard cutter Mohawk was at once requested to locate and remove this obstruction. Under date of Apr. 18, 1916, he reported that on Apr. 4 and 5, 1916, he cruised repeatedly about the neighborhood reported and was unable to find any wreck. In the meantime large quantities of wreckage had been washed ashore upon Brigantine Beach. Coast guards along that coast felt confident that the obstruction reported had broken up and come ashore.</p> | |

TABLE XXIX.

FLOATING PLANT RENTED.

4787

TABLE XXIX.—*Floating plant rented during the calendar year ending Dec. 31, 1916.*

| 1. District..... | Boston, Mass. | Buffalo, N. Y. | Charleston, S. C. | Chicago, Ill. | Cincinnati, Ohio, first. |
|---|--|---|---|---|---|
| 2. Name, letter, or number of vessel. | Eugene..... | Chippewa..... | Ida..... | Daisy..... | Dixie..... |
| 3. Name of lessee (district or person). | Eugene Breymann..... | A. R. Hinckley..... | Jenkins & McKevlin..... | John A. Oling..... | J. J. Stewart, Madison, Ind. |
| 4. Where operated..... | Boston Harbor and vicinity. | Little Sodus Harbor and Great Sodus Harbor. | Winyah Bay, S. C. (Sampit River). | Indiana Harbor, Ind. | Ohio River Dam No. 39. |
| 5. Type of vessel and material of hull. | Dipper dredge; wooden hull. | Tugboat; wood. | Tugboat; wood. | Gasoline launch; wood. | Towboat, wood hull. |
| 6. Length..... | 125 feet. | 66 feet 5 inches. | 64 feet. | 40 feet. | 90 feet. |
| 7. Beam..... | 44 feet. | 10 feet. | 13.7 feet. | 8 feet 8 inches. | 16 feet. |
| 8. Depth..... | 14 feet 4 inches at bow, 13 feet at stern. | 7 feet. | 6.6 feet. | 5 feet. | 3.6 feet. |
| 9. Draft (mean)..... | 17 feet..... | 7 feet..... | 6 feet. | 3 feet. | 18 inches. |
| 10. Type and size of engine. | See Remarks. | Noncondensing, 17 by 17 inches. | Single surface condensing, 12-inch stroke. | 4-cylinder, 4-cycle, Anderson, gasoline. | 8 inches diameter, 4-foot stroke. |
| 11. Approximate horsepower. | 670 (approximate). | Not known. | 100. | 24. | |
| 12. Type and size of boilers. | Marine drop-leg, 12 feet 11 inches long, 50 inches diameter. | do. | Upright, 10 feet 11 inches by 72 inches diameter. | | 16 feet long, 40-inch shell, with 9 6-inch flues. |
| 13. Stern wheel, side wheel, or screw. | No means of propulsion. | Screw. | Screw. | Screw. | Stern wheel. |
| 14. Accommodations..... | 23. | For crew of 4. | (¹)..... | Seating capacity for 6 passengers. | Not known. |
| 15. Date of beginning of season. | (¹)..... | Apr. 17, 1916. | May 9, 1915. | May 16, 1916. | Oct. 17, 1916. |
| 16. Time lease is to run. | (¹)..... | Dec. 7, 1916 (expired). | Feb. 29, 1916. | 71 months. | 11 days. |
| 17. Amount paid per month. | Variable; from \$6,000 to \$10,000. | \$420 per month (\$14 per calendar day). | \$676. | \$200. | \$26 per day plus cost of fuel. |
| 18. Amount paid during the calendar year. | \$169,522.36. | \$3,068. | \$1,558.13. | \$1,470.97. | \$254.17. |
| 19. Work performed..... | (¹)..... | Towing United States pier repair plant. | (¹)..... | Inspections and transportation of inspectors. | General towing for Dam No. 39. |

| | | | |
|--|---|--|--|
| <p><i>Remarks.</i></p> <p>Lease terminated Dec. 26, 1916. Boat used during construction of rubble mound breakwater, Indiana Harbor, Ind.</p> | <p><i>Remarks.</i></p> <p>1 Forecastle for crew, cabin for engineer, stateroom for master.</p> <p>1 Towing, dump scow from the dredge Cheraw in Winnebago Bay, C. to dumping ground near river, and for each other towing work as may be required by the United States.</p> | | <p><i>Remarks.</i></p> <p>1 Main engine, double tandem compound, 15-25-34, revolving, double horizontal, 10 hp 14.</p> <p>1 Under three leases, dated Dec. 2, 1914, May 8, 1916, and Nov. 14, 1916, respectively, for 1 year, 2 months, 6 months, and 6 months, respectively.</p> <p>1 Removing sand in dredged channel in Lynn Harbor, Lynde River below mouth of Island Pond River, and Boston Harbor, Mass.</p> |
|--|---|--|--|

TABLE XXIX.—*Floating plant rented during the calendar year ending Dec. 31, 1916—Continued.*

| 1. District. | Cincinnati, Ohio, first. | | | | Second Cincinnati. |
|---|---|--|---|--|--|
| | Dick C. Pape. | Lyda. | M. D. Wayman. | Northern No. 2. | Not named. |
| 2. Name, letter, or number of vessel. | Metropolis Navigation Co., Metropolis, Ill. | Pleiger Dredging Co. | H. B. Hullings. | Pleiger Dredging Co. | Clifton Bros., Zanesville, Ohio. |
| 3. Name of lessor (district or person). | Ohio River, near Paducah, Ky., and Cairo, Ill. | Ohio River, near Dam No. 31. | Lower Ohio River. | Ohio River, open-channel work, near Dam 31. | Locks Nos. 8 and 11, Muskingum River. |
| 4. Where operated. | Towboat; wood hull. | Wooden-hull towboat. | Towboat; wood. | Dipper dredge; wooden hull. | Derrick boat with clamshell bucket; wood. |
| 5. Type of vessel and material of hull. | 120 feet. | 122 feet. | 126 feet. | 90 feet. | 70 feet. |
| 6. Length. | 23 feet. | 24 feet. | 25 feet. | 32 feet. | 28 feet. |
| 7. Beam. | 4 feet 7 inches. | | 3 feet 8 inches. | | 3 feet 6 inches. |
| 8. Depth. | 3 feet 6 inches. | About 3 feet. | 2 feet 7 inches. | | 1 foot 10 inches. |
| 9. Draft (mean). | High pressure. | | 15-inch cylinder, 5-foot stroke. | Duplex hoisting engine, Marion steam shovel, 10 inches by 12 inches. | Pitts. Ind. Iron Works, 8 inches by 10 inches. |
| 10. Type and size of engines. | diameter, 44-foot stroke. | | | | |
| 11. Approximate horsepower. | 200 horsepower. | | 500. | | 40. |
| 12. Type and size of boilers. | River type, 44 inches diameter, 28 feet long. | | 2 boilers; fire tube; 39 inches by 24 feet. | Locomotive fire box, 75 horsepower. | Locomotive; 12 feet 6 inches long, 3 feet 4 inches diameter. |
| 13. Stern wheel, side wheel, or screw. | Stern wheel. | Stern wheel. | Stern wheel. | | Not self-propelling. |
| 14. Accommodations. | Crew, 10 men. | 12. | Crew of 8. | 12. | None. |
| 15. Date of beginning of lease. | Sept. 26, 1916. | Nov. 29. | Oct. 6, 1916. | Nov. 29. | Apr. 24, 1916. |
| 16. Time lease is to run. | Dec. 16, 1916. | Dec. 19. | Dec. 18, 1916—2 months. | Dec. 19. | 10 days. |
| 17. Amount paid per month. | \$20 per day. | \$46 per day. | \$47.50 per working-day and fuel. | \$100 per day. | \$20 per day; towing, \$20. |
| 18. Amount paid during the calendar year. | \$1,630. | \$742.50. | \$3,131.04. | \$1,650. | \$220. |
| 19. Work performed. | Tender for U. S. dredge Zebra, operating on Ohio River between Paducah, Ky., and Cairo, Ill. | Tender for hired dredge Northern No. 2. | Towing U. S. dredge Indiana. | 11,650 cubic yards of sand and gravel excavated from channel. | Dredged 4,110 cubic yards of deposits. |
| | <i>Remarks.</i>
This towboat with dredge Northern No. 2 and 2 dump scoops made up a dredging outfit for which a payment of \$146 per day was made for each day when dredge worked 8 hours. | <i>Remarks.</i>
Furnished 885.44 tons coal at \$2.1761 per ton—\$1,918.47. Total cost to the United States, \$3,904.51. | <i>Remarks.</i> | | <i>Remarks.</i>
Removed sedimentary deposits from approaches to Locks Nos. 8 and 11, Muskingum River. |

| 1. District. | Galveston, Tex. | | |
|---|---|--|--|
| | Detroit, Mich. (lake survey). | Duluth, Minn. | Galveston, Tex. |
| 2. Name, letter, or number of vessel. | | No. 10. | Eclipse. |
| 3. Name of lessee (district or person). | | Zenith Dredge Co. | Earl Nelson. |
| 4. Where operated. | | Grand Marais, Mich., and Duluth, Minn. | Inland waterway. |
| 5. Type of vessel and material of hull. | | Dump scow; wood. | Gasoline launch; wood. |
| 6. Length. | | 144.2 feet. | 38 feet 6 inches. |
| 7. Beam. | | 26.3 feet. | 12 feet. |
| 8. Depth. | | 11.9 feet. | 2 feet 94 inches. |
| 9. Draft (mean). | | 6.75 feet. | 3 feet 8 inches. |
| 10. Type and size of engines. | | None. | 6-cylinder Clifton. |
| 11. Approximate horsepower. | | None. | 50 horsepower. |
| 12. Type and size of boilers or screw. | | None. | Screw. |
| 13. Accommodations. | | None. | None. |
| 14. Date of beginning of lease. | | Aug. 1, 1916. | Dec. 1, 1915. |
| 15. Time lease is to run. | | For such time as may be needed. | 4 months. |
| 16. Amount paid per month. | | \$25 per working day. | \$420 per month. |
| 17. Amount paid during the calendar year. | | \$1,500. | \$1,260. |
| 18. Work performed. | | Transporting dredged material. | Tending dredge Guadalupe. |
| | <i>Remarks.</i>
No floating plant rented by the lake survey office under formal lease during calendar year ending Dec. 31, 1916. | <i>Remarks.</i>
1 Rental necessary due to delay in construction of steel scoops for United States; amount paid deducted from that contract. | <i>Remarks.</i>
1 Rental necessary due to delay in construction of steel scoops for United States; amount paid deducted from that contract. |

| Jacksonville, Fla. | | | | |
|--------------------|---|---|--|--|
| 1. District..... | 2. Name, letter, or number of vessel. | 3. Name of lessee (district or person). | 4. Where operated. | 5. Type of vessel and material of hull. |
| | Margie D..... | John S. Dricoll..... | Otto..... | Ruth..... |
| | John S. Dricoll..... | Robert Otto..... | J. S. Parsons, New Berlin, Fla. | Stuart Lumber Co..... |
| | St. Johns River, Fla., Jacksonville to ocean. | Biscayne Bay..... | St. Johns River, Fla., Jacksonville to ocean. | St. Lucie Inlet..... |
| | Gasoline tug, wood. | Cabin gasoline launch, wood. | Gasoline runabout, wood. | Decked lighter, wood. |
| | 20 feet..... | 30 feet..... | 20 feet..... | 36 feet..... |
| | 9..... | 9 feet..... | 7 feet..... | 10 feet 6 inches..... |
| | 3 feet 6 inches..... | 7 feet 6 inches..... | 3 feet..... | 3 feet..... |
| | 3 feet..... | 2 feet 6 inches..... | 21 feet..... | 1 foot 2 inches..... |
| | Single-cylinder, 5 ft by 6 inches, Mianus. | 4-cycle, gasoline motor. | Gasoline, 2-cycle, single-cylinder, 5 ft by 6 inches. | None..... |
| | 8..... | 15..... | 6..... | do..... |
| | None..... | None..... | None..... | do..... |
| | Screw..... | Screw..... | Screw..... | Screw..... |
| | None..... | Seats..... | None..... | Fixed seats. |
| | Nov. 27, 1916..... | Sept. 1, 1916..... | Hired when needed..... | No lease. |
| | May 27, 1917..... | Dec. 31, 1916..... | Dec. 31, 1916..... | Sept. 30, 1916..... |
| | \$30..... | \$100..... | \$1.75 per day..... | \$26..... |
| | \$24..... | \$686.67..... | \$19.75..... | \$87.66..... |
| | Dredge tender ¹ | (¹)..... | Tending dredge Mallery as dispatch boat. | Used in survey of St. Lucie Inlet. |
| | Remarks..... | Remarks..... | Remarks..... | Remarks..... |
| | ¹ Replacing launch Mai, which is worn out and is to be condemned. The service is as dispatch boat and light towing for the dredge Major J. C. Mallery. | ¹ Used on surveys and examinations in connection with improvement of Biscayne Bay. | To replace launch Mai when the Mai was out of commission and under repair. | ¹ Hired by the day.
² As inspection and tow-boat in removal of hydranth in the upper Withlacoochee River. |
| | 16. Time lease is to run..... | | | |
| | 17. Amount paid per month..... | | | |
| | 18. Amount paid during the calendar year..... | | | |
| | 19. Work performed..... | | | |

TABLE XXIX.—*Floating plant rented during the calendar year ending Dec. 31, 1916—Continued.*

| 1. District..... | Jacksonville, Fla. | | Kansas City, Mo. | |
|---|--|---|---|---|
| | Not named..... | Bowers Southern Dredging Co.
Miami, Fla.
Drill barge..... | Gustave Wohlt.....
Hermann Ferry & Packet Co.
Lower Missouri River.....
Towboat, wood..... | Leavenworth.....
Eli C. Dresser, Leavenworth, Kans.
Lower Missouri River.....
Towboat, wood..... |
| 2. Name, letter, or number of vessel..... | Merrill-Stevens Co..... | 13 feet..... | (1)..... | (1)..... |
| 3. Name of lessor (district or person)..... | (1)..... | 16 feet..... | (1)..... | (1)..... |
| 4. Where operated..... | Open gasoline launch, wood..... | 3 feet..... | (1)..... | (1)..... |
| 5. Type of vessel and material of hull..... | 14 feet 6 inches..... | 1.7 feet..... | (1)..... | (1)..... |
| 6. Length..... | 5 feet..... | ..... | (1)..... | (1)..... |
| 7. Beam..... | 1 foot 8 inches..... | ..... | (1)..... | (1)..... |
| 8. Depth..... | 7 inches..... | ..... | (1)..... | (1)..... |
| 9. Draft (mean)..... | 2-cycle, gasoline motor, 34 by 4 inches..... | ..... | (1)..... | (1)..... |
| 10. Type and size of engines..... | 3..... | ..... | (1)..... | (1)..... |
| 11. Approximate horsepower..... | None..... | ..... | (1)..... | (1)..... |
| 12. Type and size of boiler, or screw..... | Screw..... | ..... | (1)..... | (1)..... |
| 13. Stern wheel, side wheel, or screw..... | Fixed seats for 4..... | ..... | (1)..... | (1)..... |
| 14. Accommodations..... | May 1, 1916..... | No lease..... | (1)..... | (1)..... |
| 15. Date of beginning of lease..... | Sept. 30, 1916..... | do..... | (1)..... | (1)..... |
| 16. Time lease is to run..... | Amount paid per month \$30..... | \$15..... | (1)..... | (1)..... |
| 17. Amount paid per month..... | Amount paid during the calendar year..... | Total paid, \$23.95..... | (1)..... | (1)..... |
| 18. Amount paid during the calendar year..... | Work performed..... | See Remarks..... | (1)..... | (1)..... |
| 19. Work performed..... | Remarks..... | Remarks..... | Remarks..... | Remarks..... |

| Kansas City, Mo. | | Little Rock, Ark. | |
|---|---|--|--|
| 1. District..... | | | |
| 2. Name, letter, or number of vessel..... | 16..... | J. C. Allee..... | Wolverine..... |
| 3. Name of lessor (district or person)..... | Kansas City Bridge Co..... | Miller Engineering Co..... | Miller Engineering Co..... |
| 4. Where operated..... | Lower Missouri River..... | Arkansas River..... | Arkansas River..... |
| 5. Type of vessel and material of hull..... | Hydraulic grader; wood..... | Steam; wood hull..... | Barge; wood hull..... |
| 6. Length..... | 70 feet..... | 101 feet..... | 64 feet 5 inches..... |
| 7. Beam..... | 24 feet..... | 19 feet 4 inches..... | 20 feet 2 inches..... |
| 8. Depth..... | No record..... | 3 feet 4 inches..... | 3 feet 2 inches..... |
| 9. Draft (mean)..... | do..... | 3 feet 4 inches..... | 2 feet 6 inches..... |
| 10. Type and size of engines..... | do..... | 104 by 4 feet (Mississippi River)..... | Gasoline..... |
| 11. Approximate horsepower..... | do..... | 50..... | 50..... |
| 12. Type and size of boilers..... | do..... | Mississippi River; 44 inches by 20 feet..... | None..... |
| 13. Stern wheel, side wheel, or screw..... | do..... | Stern wheel..... | Stern wheel..... |
| 14. Accommodations..... | None..... | 4..... | 4..... |
| 15. Date of beginning of lease..... | Aug. 20, 1916..... | Aug. 21, 1916..... | (1)..... |
| 16. Time lease is to run..... | To Sept. 30, 1916..... | Jan. 15, 1917..... | (1)..... |
| 17. Amount paid..... | \$10 per day..... | \$35 per day..... | \$45 per day..... |
| 18. Amount paid during the calendar year..... | \$330..... | \$5,212.60..... | \$705.50..... |
| 19. Work performed..... | Hydraulic grading for revetment..... | Dredge tender..... | Dredge tender..... |
| | Remarks..... | Remarks..... | Remarks..... |
| | Missouri River (Kansas City to mouth). Graded 1,050 linear feet of bank; moved 15,551 cubic yards of earth. Total number of hours pumping, 126. | Also employed Jan. 1-14, under lease made Aug. 14, 1915. Government furnishing fuel. | No lease. 16 days on intermittent service. No lease. Storage of brush for 18 days in revetment repair at Pine Bluff. |
| | | | No lease. Fuel barge for Arkansas River dredges 11½ days. |

TABLE XXIX.—*Floating plant rented during the calendar year ending Dec. 31, 1916—Continued.*

| Little Rock, Ark. | | | | |
|---|--|---|---|---|
| 1. District. | 2. Name, letter, or number of vessel. | 3. Name of lessor (district or person). | 4. Where operated. | 5. Type of vessel and material of hull. |
| | Miller. | W. P. McGeorge. | Arkansas River. | Oil; wood hull. |
| | W. P. McGeorge. | Arkansas River. | Arkansas River. | Barge; wood hull. |
| 6. Length. | 54 feet 5 inches. | 80 feet. | 65 feet. | 80 feet. |
| 7. Beam. | 12 feet 6 inches. | 22 feet. | 20 feet. | 22 feet. |
| 8. Depth. | 3 feet 2 inches. | 4 feet. | 4 feet. | 5 feet. |
| 9. Draft (mean). | 1 foot 6 inches. | 3 feet 6 inches. | 3 feet 6 inches. | 4 feet 6 inches. |
| 10. Type and size of engines. | 3-cylinder, oil. | | | |
| 11. Approximate horsepower. | 45. | | | |
| 12. Type and size of boilers. | None. | | | |
| 13. Stern wheel, side wheel, or screw. | Stern wheel. | | | |
| 14. Accommodations. | 6. | | | |
| 15. Date of beginning of lease. | (1). | (1). | (1). | (1). |
| 16. Time lease is to run. | (1). | (1). | (1). | (1). |
| 17. Amount paid per month. | \$2 per hour and \$30 per day. | \$30 per month. | \$30 per month. | \$30 per month. |
| 18. Amount paid during the calendar year. | \$143. | \$813.34. | \$831.77. | \$875.95. |
| 19. Work performed. | (1). | (1). | (1). | (1). |
| | Remarks. | Remarks. | Remarks. | Remarks. |
| | No lease. Boat used intermittently as tow-boat in revetment repair at Pine Bluff for 7 1/2 hours and 12 days as dredge tender. | No lease. Intermitent service in revetment repair at Pine Bluff 7 months and 1 day. | No lease. Intermitent service in revetment repair at Pine Bluff 7 months and 1 day. | No lease. Intermitent service in revetment repair at Pine Bluff 9 months and 23 days. |

FLOATING PLANT.

4797

| 1. District..... | Little Rock, Ark. | Louisville, Ky. | | | Mississippi River, first and second districts, Memphis, Tenn. |
|---|-----------------------|--|---|---|---|
| 2. Name, letter, or number of vessel..... | No name..... | Leader..... | No. 32..... |1..... | Cincinnati. |
| 3. Name of lessor (district or person)..... | W. F. McGeorge..... | The Frankfort Elevator Coal Co..... | Crenshaw & Hall..... | Jones & Mudge..... | Cincinnati, Ohio, first district. |
| 4. Where operated..... | Arkansas River..... | Dam No. 43, Ohio River..... | Green and Barron Rivers, Ky..... | Green and Barron Rivers, Ky., wood. | Memphis, Tenn., harbor. |
| 5. Type of vessel..... | Barge, wood hull..... | Stern wheel steam towboat..... | Barge, wood..... | Barge, wood..... | Dipper dredge, steel hull. |
| 6. Length..... | 65 feet..... | 88 feet..... | 100 feet..... | 100 feet..... | 177 feet. |
| 7. Beam..... | 22 feet..... | 20 feet..... | 24 feet..... | 24 feet..... | 34 feet. |
| 8. Depth..... | 5 feet..... | 2 feet 3 inches..... | 6 feet 4 inches..... | 6 feet 4 inches..... | 6 feet 10 inches. |
| 9. Draft (mean)..... | 4 feet 6 inches..... | 2 feet..... | 1 foot 6 inches..... | 1 foot 6 inches..... | Unknown. |
| 10. Type and size of engines..... | ..... | Horizontal, poppet valve, noncondensing; 34 feet by 11 inches..... | ..... | ..... | Nonpropelling. |
| 11. Approximate horsepower..... | ..... | ..... | ..... | ..... | Unknown. |
| 12. Type and size of boilers..... | ..... | Fire box 18 feet by 48 inches..... | ..... | ..... | Do. |
| 13. Stern wheel, side wheel, or screw..... | ..... | ..... | ..... | ..... | Nonpropelling. |
| 14. Accommodations..... | ..... | Stateroom for officers, berths for crew..... | ..... | ..... | Unknown. |
| 15. Date of beginning of lease..... | (1)..... | Aug. 9, 1916 ¹ | May 27, 1916 ¹ | Apr. 25, 1916 ¹ | Dec. 1, 1916. |
| 16. Time lease is to run..... | (1)..... | Terminated Sept. 30, 1916 ¹ | Terminated Oct. 27, 1916 ¹ | Terminated Oct. 27, 1916 ¹ | No stated time. ² |
| 17. Amount paid per month..... | \$40..... | \$750..... | \$60..... | \$60..... | (3). |
| 18. Amount paid during the fiscal year..... | \$308.33..... | \$2,675..... | \$308..... | \$372..... | (3). |
| 19. Work performed..... | (3)..... | Towing dredges, barges, etc..... | Transportation, repair materials..... | Transportation, repair materials..... | (4). |

TABLE XXIX.—*Floating plant rented during the calendar year ending Dec. 31, 1916—(continued).*

| 1. District..... | Little Rock, Ark. | Louisville, Ky. | Mississippi River, first and second districts, Memphis Tenn. |
|------------------|---|--|---|
| | <i>Remarks.</i>
1 No lease.
1 Intermittent service in
permanent repair at Pine
Bluff, 3 months and 13 days. | <i>Remarks.</i>
1 Under verbal agreement,
May 27 to Aug. 24; written
agreement, Aug. 25 to Oct.
27, inclusive. | <i>Remarks.</i>
1 This dredge was turned
over to the first and second
districts to complete dredg-
ing operations on Memphis,
Tenn., harbor work. The
dredge previously had been
borrowed from the first Cin-
cinnati, Ohio, district. No
charge was made for the use
of the dredge.
2 Returned to Mississippi
River Commission Dec. 16,
1916.
3 No charge was made for
use of the dredge.
4 Dredging entrance to di-
version canal, Wolf River,
Memphis, Tenn. |

TABLE XXIX.—*Floating plant rented during the calendar year ending Dec. 31, 1916—Continued.*

| 1. District. | Mississippi River, first and second districts, Memphis, Tenn. | | | | Montgomery, Ala. |
|---|--|--|--|--|--|
| | No name. | No name. | No name. | No number (two steel scows) | J. W. Callahan, Jr. |
| 2. Name, letter, or number of vessel. | Not known. | Not known. | Not known. | Cincinnati, Ohio, first district. ¹ | The Callahan Line. |
| 3. Name of lessor (district or person). | (1) | (1) | (1) | Memphis, Tenn., harbor. | Flint River, Ga. |
| 4. Where operated. | Gasoline skiff. | Gasoline skiff. | Gasoline launch. | Dump scow. | Stern wheel river steamer. |
| 5. Type of vessel and material of hull. | Gasoline skiff. | Gasoline skiff. | Gasoline launch. | 85 feet 24 inches. | wood. |
| 6. Length. | ..... | ..... | ..... | 22 feet 74 inches. | 110 feet. |
| 7. Beam. | ..... | ..... | ..... | 6 feet. | 23 feet. |
| 8. Depth. | ..... | ..... | ..... | 3 feet light, 5 feet 6 inches loaded. | 4 feet. |
| 9. Draft (mean). | ..... | ..... | ..... | Name. | 2 feet. |
| 10. Type and size of engines. | ..... | ..... | ..... | do. | Slide valve, Poppet cut-off: 8 by 48 inches. |
| 11. Approximate horsepower. | ..... | ..... | ..... | do. | 120. |
| 12. Type and size of boilers. | ..... | ..... | ..... | do. | 2 western-river cylinder, 14 feet by 36 inches. |
| 13. Stern wheel, side wheel, or screw. | Screw. | Screw. | Screw. | do. | Stern wheel. |
| 14. Accommodations. | ..... | ..... | ..... | do. | For freight and passengers. |
| 15. Date of beginning of lease. | Feb. 1, 1916. | Feb. 12, 1916. | Feb. 2, 1916. | Dec. 1, 1916. | Nov. 6, 1916. |
| 16. Time lease is to run. | 3 days. | About 2 days. | 34 days. | No stated time. ² | Less than 3 months. |
| 17. Amount paid per month. | \$5 day. | \$5 day. | \$24 day. | (?) | \$600. |
| 18. Amount paid during the calendar year. | \$15. | \$6.50. | \$87.50. ³ | (?) | \$940. |
| 19. Work performed. | (?) | (?) | (?) | (?) | Tender to dredge Upatol. |
| | Remarks. | Remarks. | Remarks. | Remarks. | Remarks. |
| | ¹ Mississippi River, first and second districts. ² With crew of 3 men. ³ Work for levees during high water. | ¹ Mississippi River, first and second districts. ² With crew of 3 men. ³ Work for levees during high water. | ¹ Mississippi River, first and second districts. ² With crew of 3 men. ³ Work for levees during high water. | ¹ These scows were turned over to the first and second districts to complete dredging operations on Memphis, Tenn., harbor work. The scow had previously been borrowed from the first Cincinnati, Ohio, district. | The above plant was leased on Nov. 6, 1916, and returned to owners on Dec. 22, 1916. Price of rental included salary of master and steam engineer. |

¹ Returned to Mississippi
 River Commission, Dec. 16,
 1916.
² No charge made for use
 of these scoops.
³ Dredging entrance to di-
 version canal, Wolf River,
 Memphis, Tenn. Scoops at-
 tached to dipper dredge Chin-
 elumati.

TABLE XXIX.—*Floating plants rented during the calendar year ending Dec. 31, 1916—Continued.*

| 1. District. | New London, Conn. | | Newport, R. I. | | First New York. | |
|---|--|---------------------------|--|---|---|---|
| | Atlantic. | Second New York district. | Nepomest. | No name, etc. | Astoria. | Betty. |
| 2. Name, letter, or number of vessel. | | | John R. Burke. | C. W. Johnston. | Hastorf Contracting Co. | George D. Cooley. |
| 3. Name of lessee (district or person). | | | New Bedford and Fairhaven Harbors, Mass. | New Bedford and Fairhaven Harbors, Mass. | Harlem River, Mamaroneck, Port Chester. | Hudson River, N. Y. |
| 4. Where operated. | | | Orange-peel dredge, wooden hull, tug and 2 bottom dump scows. | Drill float, wood. | Dump scow, wood. | Steam tug, wood. |
| 5. Type of vessel and material of hull. | | | 35 feet. | 65 feet. | 120 feet 6 inches. | 44 feet. |
| 6. Length. | | | 35 feet. | 26 feet 10 inches. | 34 feet 6 inches. | 13.8 feet. |
| 7. Beam. | | | 7 feet. | Not known. | 13 feet. | 7 feet. |
| 8. Depth. | | | Not known. | 44 feet. | 4 feet light, 13 feet loaded. | 5 feet 2 inches. |
| 9. Draft (mean). | | | 3; Lambert Hoisting Engine Co., Newark, N. J. (main engine, 14 by 16 inches; spind engine, 10 by 13 inches; swinging engine, 10 by 12 inches). | Widgeonwood double drum, double-cylinder hoisting. | | Single, noncondensing, 11 by 12 inches. |
| 10. Type and size of engines. | | | Unknown. | Not known. | | |
| 11. Approximate horsepower. | 1,412. | | | | | 55. |
| 12. Type and size of boilers. | Scotch, 12 by 14 feet. | | Pennsylvania Boiler Works, Erie, Pa., return tubular, marine, 13 by 6 feet. | 10 by 4 feet; upright. | | Scotch marine. |
| 13. Stern wheel, side wheel, or screw. | Screw. | | No propelling wheel. | No propelling wheel. | | Screw. |
| 14. Accommodations. | Crew of 61. | | For crew of 10 men. | House accommodating crew of 10 men. | | Crew of 3. |
| 15. Date of beginning of lease. | Sept. 25, 1916. | | Nov. 24, 1916. | Oct. 23, 1916. | Apr. 4, 1916; Dec. 20, 1916. | Feb. 7, 1916. |
| 16. Time lease is to run. | Indefinite. | | About 1 month. | Dec. 11, 1916. | Apr. 15, 1916; Dec. 30, 1916. | May 13, 1916. |
| 17. Amount paid per month. | \$3,415.77. | | \$20 per working hour. | \$67.50 per day. | \$18; \$10.00. | \$15 per 10-hour day; \$16 per 12-hour day. |
| 18. Amount paid during the calendar year. | \$10,920.45. | | \$3,770. | \$2,769.61. | \$397.50. | \$3,064.25. |
| 19. Work performed. | Dredging main entrance channel to 23 feet. | | Removal of blasted rock. | Drilling and blasting rock in New Bedford Harbor, Mass. | Taking material from dipper dredge. | Miscellaneous towing. |

| Remarks. | Per day. | | | Per hour of over-time. |
|---|----------|----------|----------|------------------------|
| | 10-hour. | 12-hour. | 14-hour. | |
| 1 Employed also intermittently, without lease, at a total cost of \$2,454.25, at following rates: | | | | |
| Jan. 2 to Feb. 6..... | \$18 | \$20 | \$22 | \$3 |
| June 6 to Dec. 9..... | | | | 3 |

First New York.

| First New York. | | | | | | | | | | | | | | | | | | |
|------------------|---|--|--------------------------|--|--|--|--|--|---|--|-----------------------------------|--|-------------------------|-------------------------------------|-----------------------------------|--------------------------------|---|--|
| 1. District..... | 2. Name, letter, or number of vessel..... | 3. Name of lessor (district or person)..... | 4. Where operated..... | 5. Type of vessel and material of hull..... | 6. Length..... | 7. Beam..... | 8. Depth..... | 9. Draft (mean)..... | 10. Type and size of engines..... | 11. Approximate horsepower..... | 12. Type and size of boilers..... | 13. Stern wheel, side wheel, or screw..... | 14. Accommodations..... | 15. Date of beginning of lease..... | 16. Time lease is to run..... | 17. Amount paid per month..... | 18. Amount paid during the calendar year..... | 19. Work performed..... |
| | Great Bear..... | C. F. Harms Co..... | Harlem River..... | Dump scow; wood..... | 128 feet..... | 34 feet..... | 13 feet..... | 4 feet light, 12 feet loaded..... | | | | | | Mar. 24, 1916..... | Apr. 10, 1916..... | \$20 per day..... | \$300..... | Attending dipper dredge..... |
| | Julia Auten..... | Auten Engineering & Contracting Co. (Inc.), Hudson and Harlem Rivers, and Mamaroneck Harbor, N. Y. | Dipper dredge; wood..... | 90 feet.....
34 feet.....
6 feet 9 inches.....
4 feet 6 inches..... | 34 feet.....
31 feet.....
7 feet.....
1 foot, 20 inches; loaded, 64 feet..... | 34 feet.....
31 feet.....
7 feet.....
1 foot, 20 inches; loaded, 64 feet..... | 34 feet.....
31 feet.....
7 feet.....
1 foot, 20 inches; loaded, 64 feet..... | 34 feet.....
31 feet.....
7 feet.....
1 foot, 20 inches; loaded, 64 feet..... | One 15-inch square horizontal twin; two 94-inch square horizontal twin, reversible..... | Locomotive; 138 horsepower. Nonpropelling..... | | | For crew of 8..... | May 9, 1916, Sept. 1916..... | Aug. 31, 1916, Dec. 31, 1916..... | \$1,150..... | \$11,856.90..... | Dredging broken rock, sand, and mud..... |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

| 1. District..... | New York, first. | | | | New York, second. | | | |
|---|---------------------------|---------------------------|--------------------------------|--------------------------------|----------------------------------|--|--|--|
| | Sy-18..... | Sy-22..... | Virginia..... | Atlantic..... | Navesink..... | | | |
| 2. Name, letter, or number of vessel..... | Seely Engineering Co..... | Seely Engineering Co..... | Hastorf Contracting Co..... | New London..... | Newport, R. I..... | | | |
| 3. Name of lessor (district or person)..... | Harlem River, N. Y..... | Harlem River, N. Y..... | Harlem River..... | New London Harbor..... | Pollock Rip Shoal..... | | | |
| 4. Where operated..... | Wooden deck scow..... | Wooden scow..... | Dump scow; wood..... | Seagoing dredge; steel..... | Seagoing dredge..... | | | |
| 5. Type of vessel and material of hull..... | No record..... | No record..... | 120..... | 288 feet..... | 280 feet..... | | | |
| 6. Length..... | do..... | do..... | 35..... | 47 feet 6 inches..... | 47 feet 6 inches..... | | | |
| 7. Beam..... | do..... | do..... | 13..... | 25 feet..... | 25 feet..... | | | |
| 8. Depth..... | do..... | do..... | 3.5 light; 12 feet loaded..... | 12 feet (light)..... | 14 feet (light)..... | | | |
| 9. Draft (mean)..... | do..... | do..... | 3.5 light; 12 feet loaded..... | Upright-Comp. 22+44 by 30..... | Upright-Comp. 22+40 by 30..... | | | |
| 10. Type and size of engines..... | do..... | do..... | 3.5 light; 12 feet loaded..... | 1,412..... | 1,886..... | | | |
| 11. Approximate horsepower..... | do..... | do..... | do..... | do..... | do..... | | | |
| 12. Type and size of boilers..... | do..... | do..... | do..... | do..... | do..... | | | |
| 13. Stern wheel, side wheel, or screw..... | do..... | do..... | do..... | do..... | do..... | | | |
| 14. Accommodations..... | do..... | do..... | do..... | do..... | do..... | | | |
| 15. Date of beginning of lease..... | No lease..... | Jan. 12, 1916..... | Jan. 26, 1916..... | 83 men..... | 83 men..... | | | |
| 16. Time lease is to run..... | do..... | Feb. 21, 1916..... | Feb. 29, 1916..... | Sept. 24, 1916..... | Sept. 23, 1912..... | | | |
| 17. Amount paid per month..... | \$2 per day..... | \$5 per day..... | \$300..... | 6 months (approximate)..... | Indefinite..... | | | |
| 18. Amount paid during the calendar year..... | \$34..... | \$205..... | \$350..... | \$3,615..... | Free as per act of Congress..... | | | |
| 19. Work performed..... | Coal and water scow..... | do..... | Attending dipper dredge..... | Not known..... | Not known..... | | | |

| | | | | | |
|---|---|---|--|--|--|
| 17. Amount paid per month
18. Amount paid during
the calendar year. | Rate per day, \$8.
Total amount paid, \$150.
Harlan River \$14; South
River, \$28; Harlan Bay,
\$8. | do.
\$6,047.75. | \$3,104.76. | Rate per day, \$8.
\$8. | \$15 per day.
\$1,425. |
| 19. Work performed | Used to convey and wait
upon survey party. | The dredge worked in Wood-
bridge Creek from Feb. 12
to Feb. 28, 1916. The
Andrew A. Talcott, which
it succeeded, worked from
Feb. 5 to Feb. 12. The
channel was restored by
the 2 dredges to full
project dimensions for a
distance of 6,000 feet. The
amount of material re-
moved from within project
limits by both dredges
during the period was
18,383 cubic yards, plus
measurement. No esti-
mate was made separating
the work, the bulk of
which was done by the
Talcott. | This dredge was employed
in Shoal Harbor and
Compton Creek from Mar.
1 to 10, inclusive. Dredg-
ing was commenced, but
little progress was made,
owing to bad weather, and
because of the fact that
plant was not in working
order. The work was
abandoned on Mar. 7.
Pending necessary changes
and repairs in plant, which
was returned to the first
district. The work accom-
plished was practically
nothing. No estimate was
ever made. | Used to wait upon and
convey survey party on
survey of channel north
of Shooters Island, N. Y.
and N. J. | Used by survey party to
make probe borings on
survey of Newark Bay.
Used 95 days, at \$15 per
day. The complete out-
fit consisted of one launch,
skiff, and one or two
bateaux, with pontoons
rigged up to carry protecting
buftat, small pump, pipe
lines, and other appur-
tenances. |

TABLE XXIX.—*Floating plant rented during the calendar year ending Dec. 31, 1916—Continued.*

| | | New York, N. Y., third. | | | |
|---|--|--------------------------------|--|--|--|
| 1. District..... | | Traveler..... | Uncle John and other similar launches.
John Van Pelt, 1 South Front Street, Elizabeth, N. J.
N. J.
Used on survey work to assist and transport party. | Unmanned.
John Van Pelt, 1 South Front Street, Elizabeth, N. J.
Arthur Kill, N. Y. and N. J. | |
| 2. Name, letter, or number of vessel. | Capt. Andrew Talcott..... | Fred Vorhees, Highlands, N. J. | Used on survey of fishpounds, Atlantic Ocean, and survey Shrewsbury River, N. J. | Gasoline launch, wooden hull | Wooden scow. |
| 3. Name of lessor (district or person). | First district, New York, U. S. Engineer Corps. | Matawan (reck, N. J.)..... | Hydraulic pump dredge, wooden hull. | About 30 feet. | About 30 feet. |
| 4. Where operated..... | Woodbridge (reck, N. J.)..... | | 111 feet 8 inches. | About 8 feet. | About 13 feet. |
| 5. Type of vessel and material of hull. | Hydraulic pump dredge, wooden hull. | | 32 feet. | About 4 feet. | About 4 feet. |
| 6. Length..... | 22 feet. | | 7 feet 5 inches. | About 1 foot. | About 2 feet. |
| 7. Beam..... | 9 feet 7 inches. | | 7.5 feet. | Gasoline; Sterling. | None. |
| 8. Depth..... | 7 feet 5 inches. | | Main pumping, one 15 by 28 by 18 inches; cutter engine, 10 by 10 inches; hauling engine, 84 by 12 inches. | 6. | Do. |
| 9. Draft (mean)..... | Main pumping, one 15 by 28 by 18 inches; cutter engine, 10 by 10 inches; hauling engine, 84 by 12 inches. | | 1 Heine water tube, 19 by 14 feet. | Do. | Do. |
| 10. Type and size of engines. | 1 Heine water tube, 19 by 14 feet. | | No locomotive power. | Screw. | Do. |
| 11. Approximate horsepower. | No locomotive power. | | Carry 40 to 50 men. | Carry about 10 men. | Do. |
| 12. Type and size of boilers. | Carry 40 to 50 men. | | No lease; an agreement made to use the dredge during the winter months. | Hired by the day; no lease. | Hired by the day; no lease. |
| 13. Stern wheel, side wheel, or screw. | No lease; an agreement made to use the dredge for an indefinite period during the winter months. | | No time set. | do. | Do. |
| 14. Accommodations..... | Carry 40 to 50 men. | | \$11,764.76. | Rate per day, \$8. | Rate per day, \$8. |
| 15. Date of beginning of lease. | No lease; an agreement made to use the dredge for an indefinite period during the winter months. | | | Shrewsbury River, \$30; fishpounds survey, \$40. | \$1,076.50. |
| 16. Time lease is to run. | \$9,047.79; this amount defrayed the actual running expenses of the dredge plus a certain percentage for renewals and deterioration. | | (1) | (1) | Used by survey party to take probe borings on Arthur Kill, N. Y. and N. J. |
| 17. Amount paid per month. | | | | | |
| 18. Amount paid during the calendar year. | | | | | |
| 19. Work performed..... | | | | | |

| Remarks. | Remarks. | Remarks. |
|---|---|--|
| <p>1 The dredge worked in Woodbridge Creek from Feb. 5 to Feb. 12 inclusive. The Gen. G. L. Gillespie replaced the dredge on the latter date until the work was completed on Feb. 26, 1916. The channel was restored to full project dimensions for a distance of 6,000 feet. The amount of material removed from within project limits by both dredges during the period was 18,798 cubic yards, place measurement. No estimate was made separately of the work the bulk of which was done by the Talcott.</p> | <p>1 This dredge was employed in Matawan Creek from Dec. 17, 1915, to Feb. 2, 1916, inclusive, during which time there was removed from within channel limits as defined by the governing project 33,388 cubic yards, place measurement. The total number of yards removed during this period was 114,323 cubic yards. The total number of yards removed from Jan. 1 to Feb. 2, 1916, was 70,940. The attending plant consisted of 1 tugboat, 1 quarter boat, 1 coal boat, 2 water boats, 1 launch, pipe lines, and pon-toons. A full report covering the performance of this dredge for the period will be submitted by district No. 1, New York City.</p> | <p>1 Used to wait on survey party. These launches were used during this period on the following works: Staten Island Sound or Arthur Kill, 98.4 days, \$745.50; channel north of Shooters Island, 2 days, \$16; Hackensack River, 124 days, \$87; Newark Bay and Passaic River, 201 days, \$106; Rahway River, 1 day, \$8; Passaic River, 5 days, \$40; total, \$1,075.50; 6-foot project.</p> |

TABLE XXIX.—*Floating plant rented during the calendar year ending Dec. 31, 1916—Continued.*

| | | New York, N. Y., third. | | | |
|---|--|--|---|--|--|
| 1. District..... | | | | | |
| 2. Name, letter, or number of vessel. | | Unknown; small gasoline launch. | Unknown; small gasoline launch. | Unknown; small gasoline launch. | Unknown; small launch. |
| 3. Name of lessor (district or person). | | Fred. F. Exner, Carteret, N. J. | Philip G. Hyer, Keyport, N. J. | William O. Sheldon, Highlands, N. J. | Harry Rodgers, Sea Bright, N. J. |
| 4. Where operated..... | | Used on survey, Arthur Kill, N. Y. and N. J. | Used on survey, Bay, N. Y. and N. J. | Shrewsbury River, N. J. | Used on survey of Shrewsbury River, N. J. |
| 5. Type of vessel and material of hull. | | Small gasoline launch, wooden hull. | Small gasoline launch, wooden hull. | Small gasoline launch, wooden hull. | Small gasoline launch. |
| 6. Length..... | | About 30 feet. | About 25 to 30 feet. | About 25 feet. | About 25 to 30 feet. |
| 7. Beam..... | | About 8 feet. | About 8 to 9 feet. | About 7 feet. | About 7 to 8 feet. |
| 8. Depth..... |  | ..... | About 3 to 4 feet. | About 3 to 4 feet. | About 4 feet. |
| 9. Draft (mean)..... | | About 2 feet. | About 2 feet. | About 1½ feet. | About 1 foot. |
| 10. Type and size of engines. | | Gasoline engine; type unknown. | Gasoline engine; make unknown. | Small gasoline engine. | Gasoline engine. |
| 11. Approximate horsepower. | | Unknown. | 6 to 7. | 8 to 10. | 4 or 5. |
| 12. Type and size of boilers. | | None. | None. | None. | None. |
| 13. Stern wheel, side wheel, or screw. | | Screw. | Screw. | Screw. | Screw. |
| 14. Accommodations..... | | 5 to 10 persons. | Carry about 10 persons; no accommodations. | Carry about 12 people; no accommodations. | Carry 8 to 9 persons. |
| 15. Date of beginning of lease. | | No lease, hired by the day. | No lease, hired by the day. | No lease, hired by the day. | No lease, hired by the day. |
| 16. Time lease is to run. | | do. | do. | do. | Do. |
| 17. Amount paid per month. | | Rate per day, \$8. | Rate per day, \$8. | Rate per day, \$10. | Rate per day, \$8. |
| 18. Amount paid during the calendar year. | | \$11. | \$24. | \$13. | \$24. |
| 19. Work performed..... | | Used 18 days on survey to locate docks and bulkheads on Arthur Kill, N. Y. and N. J. | Used on surveys of Raritan Bay after dredging to convey and wait upon survey party. | Used on harbor-line survey, Raritan River, to convey and wait upon survey party. | Used on survey of Shrewsbury River, N. J., to convey and wait upon survey party. |

| District..... | | Portland, Me. | | | | |
|---|---|---|--------------------------------------|--|---|----------------------------|
| 1. District..... | 2. Name, letter, or number of vessel. | Alpha..... | Atlas..... | Lighter No. 55..... | No name..... | No name..... |
| 3. Name of owner (district or person). | 3. Name of owner (district or person). | E. A. Over..... | P. H. Doyen Co..... | Portland Ship Building Co..... | Chas. L. Nickerson..... | Chas. H. Littlejohn..... |
| 4. Where operated. | 4. Where operated. | Correa Harbor, Me..... | Correa, Me..... | Portland, Me..... | Portland Harbor, Me..... | Portland Harbor, Me. |
| 5. Type of vessel and material of hull. | 5. Type of vessel and material of hull. | Lobster smack, wood..... | Steam lighter, wood..... | Scow with A frame and boom, hauling engine, no propelling power, wood..... | Motor boat, wood..... | Motor boat, wood. |
| 6. Length. | 6. Length. | 40 feet..... | 50 feet..... | 60 feet..... | 30 feet..... | 22 feet. |
| 7. Beam. | 7. Beam. | 9 feet..... | 20.6 feet..... | 21.5 feet..... | 6 feet..... | 6 feet. |
| 8. Depth. | 8. Depth. | 5 feet..... | 7.1 feet..... | 3.5 feet..... | 1 foot 6 inches..... | 11 feet. |
| 9. Draft (mean). | 9. Draft (mean). | 21 feet..... | 3 feet..... | Having engine, single cylinder, 3 drums. | 2 cylinders, 2-cycle, Roberts, gasoline. | Single-cylinder. |
| 10. Type and also of engines. | 10. Type and also of engines. | 2-cylinder Murray & Tregurtha, gasoline; 2-cylinder Knox, gasoline. | 300..... | 20..... | 6..... | 4. |
| 11. Approximate horse-power. | 11. Approximate horse-power. | 10 by 6..... | 200..... | 20..... | 6..... | 4. |
| 12. Type and size of boilers. | 12. Type and size of boilers. | ..... | 2 Roberts water-tube No. 12. | Vertical, tubular, 40 by 84 inches. | ..... | ..... |
| 13. Stern wheel, side wheel, or screw. | 13. Stern wheel, side wheel, or screw. | ..... | Twin screw..... | None..... | Screw..... | Screw. |
| 14. Accommodations. | 14. Accommodations. | ..... | 6 men..... | do..... | Seating space, about 20 passengers. | Seating for 15. |
| 15. Date of beginning of lease. | 15. Date of beginning of lease. | Oct. 23, 1916..... | Oct. 28, 1916..... | July 10, 1916..... | Apr. 24, 1916..... | July 27, 1916. |
| 16. Time lease is to run. | 16. Time lease is to run. | Nov. 1, 1916..... | Nov. 1, 1916, completed..... | Sept. 25, 1916..... | May 20, 1916..... | Sept. 7, 1916. |
| 17. Amount paid per month. | 17. Amount paid per month. | \$12 per day; price to include gasoline and gear. | \$45 per day..... | \$30 per working day..... | \$5 per working day..... | \$3 per working day. |
| 18. Amount paid during the calendar year. | 18. Amount paid during the calendar year. | \$16..... | \$225..... | \$1,080..... | \$120..... | \$81. |
| 19. Work performed. | 19. Work performed. | Tending diver while removing wreck in Correa Harbor, Me. | Removing wreck in Correa Harbor, Me. | Used in taking borings in Portland Harbor. | Transporting workmen from Portland to Long Island and to Cushing's Island, Portland Harbor. | Survey of Portland Harbor. |

TABLE XXIX.—*Floating plant rented during the calendar year ending Dec. 31, 1916—Continued.*

| 1. District..... | 2. Name, letter, or number of vessel. | 3. Name of lessor (district or person). | 4. Where operated..... | Portland, Oreg., first. | | Porto Rico. | | San Francisco, Cal., first. | |
|---|---------------------------------------|---|----------------------------|-----------------------------------|-----------------------------------|---|--|---|---|
| | | | | Walter..... | None..... | None..... | General Alexander..... | Ancon..... | Bonita..... |
| 5. Type of vessel and material of hull..... | Gasoline launch, wood..... | Walter Holst..... | Tillamook Bay..... | Gasoline launch, wooden hull..... | F. H. Johnson..... | Pacific Engineering & Construction Co.
Humboldt Bay..... | Pacific Engineering & Construction Co.
Humboldt Bay..... | Oakland Launch & Tug Boat Co.
Petaluma Creek and Sulsum Channel..... | Pacific Engineering & Construction Co.
Humboldt Bay..... |
| 6. Length..... | 45 feet..... | Walter Holst..... | Gasoline launch, wood..... | 16 feet..... | San Juan..... | Steam tug, wood..... | Steam tug, wood..... | Gas, screw, wood..... | Steam tug, wood..... |
| 7. Beam..... | 11 feet 6 inches..... | Walter Holst..... | Gasoline launch, wood..... | 3 feet 6 inches..... | Gasoline launch, wooden hull..... | 77 feet 7 inches..... | 77 feet 7 inches..... | 38 feet 6 inches..... | 58 feet 7 inches..... |
| 8. Depth..... | 3 feet 6 inches..... | Walter Holst..... | Gasoline launch, wood..... | 2 feet 6 inches..... | Gasoline launch, wooden hull..... | 13 feet..... | 13 feet..... | 11 feet 10 inches..... | 15 feet..... |
| 9. Draft (mean)..... | 4 feet 8 inches..... | Walter Holst..... | Gasoline launch, wood..... | 1 foot..... | Gasoline launch, wooden hull..... | 8 feet..... | 8 feet..... | 4 feet 3 inches..... | 7 feet 6 inches..... |
| 10. Type and size of engines..... | Gasoline..... | Walter Holst..... | Gasoline launch, wood..... | 2-cycle, 2 horsepower..... | Gasoline launch, wooden hull..... | 7 feet 7 inches..... | 1 compound condensing engine, 9 by 21 inch cylinders and 16-inch stroke..... | 4 feet..... | 9 feet..... |
| 11. Approximate horsepower..... | 35..... | Walter Holst..... | Gasoline launch, wood..... | 2..... | Gasoline launch, wooden hull..... | 160..... | 160..... | 2-cylinder, Corliss gas..... | 1 compound condensing engine, 8 by 17 inch cylinders and 14-inch stroke..... |
| 12. Type and size of boilers..... | Screw..... | Walter Holst..... | Gasoline launch, wood..... | 2..... | Gasoline launch, wooden hull..... | Scotch marine, 9 feet long by 7 feet wide, 9.16 inches thick..... | Scotch marine, 9 feet long by 7 feet wide, 9.16 inches thick..... | 20..... | 150..... |
| 13. Stern wheel, side wheel, or screw..... | None..... | Walter Holst..... | Gasoline launch, wood..... | 2..... | Gasoline launch, wooden hull..... | Screw..... | Screw..... | Screw..... | 1 dry back, Dutch marine boiler, 9.16 inches thick by 9 feet long by 6 feet wide..... |
| 14. Accommodations..... | None..... | Walter Holst..... | Gasoline launch, wood..... | 2..... | Gasoline launch, wooden hull..... | Crew of 3..... | Crew of 3..... | None outside pilot house..... | Screw..... |
| 15. Date of beginning of lease..... | July 10, 1915..... | Walter Holst..... | Gasoline launch, wood..... | 2..... | Gasoline launch, wooden hull..... | No lease..... | No lease..... | No lease..... | Crew of 3..... |
| 16. Time lease is to run..... | Until completion of dredging..... | Walter Holst..... | Gasoline launch, wood..... | 2..... | Gasoline launch, wooden hull..... | Hired as needed at hourly rate of \$3.50..... | Hired as needed at hourly rate of \$3.50..... | Hired as needed at hourly rate of \$3.50..... | Crew of 3..... |
| 17. Amount paid per month..... | \$300..... | Walter Holst..... | Gasoline launch, wood..... | 2..... | Gasoline launch, wooden hull..... | \$54.75..... | \$54.75..... | \$300 (with skiff)..... | Hired as needed at hourly rate of \$3.50..... |
| 18. Amount paid during the calendar year..... | \$3,600..... | Walter Holst..... | Gasoline launch, wood..... | 2..... | Gasoline launch, wooden hull..... | Towing lighters and furnishing fuel to south jetty plant..... | Towing lighters and furnishing fuel to south jetty plant..... | \$657.87..... | \$41.13..... |
| 19. Work performed..... | Tending dredge Oregon..... | Walter Holst..... | Gasoline launch, wood..... | 2..... | Gasoline launch, wooden hull..... | With survey party on hydrographic surveys..... | With survey party on hydrographic surveys..... | With survey party on hydrographic surveys..... | Towing lighters and furnishing fuel to south jetty plant..... |
| | | | | | | Remarks..... | | | |
| | | | | | | Ancon was an open tug-boat used on survey of Petaluma Creek and Sulsum Channel to transport men and to tow houseboat. | | | |

13751—ENG 1917—304

TABLE XXIX.—*Floating plant rented during the calendar year ending Dec. 31, 1916—Continued.*

| San Francisco, Cal., first. | | San Francisco, Cal., third. | | | |
|---|--|---|--|--|--|
| 1. District..... | Willard C. | Denver..... | Grand Island No. 3. | Yankee..... | Unnamed. |
| 2. Name, letter, or number of vessel. | Pacific Engineering & Construction Co. | Wm. D. Nutz. | J. W. Hollenbeck. | Oakland Launch & Tug-boat Co. | C. H. Williams. |
| 3. Name of lessor (district or person). | Humboldt Bay. | Sacramento River, between Collinsville and Rio Vista. | Sacramento River, opposite 3-mile slough. | Sacramento River. | Sacramento River. |
| 4. Where operated. | Gasoline launch, wood. | Wood, gasoline launch. | Nonpropelling, steel clam-net dredge. | Oil barge, wood. | Gasoline launch; flat bottom; wooden (cedar) hull. |
| 5. Type of vessel and material of hull. | 50 feet 8 inches. | 30 feet. | 140 feet. | 71 feet. | 33 feet. |
| 6. Length. | 12 feet 8 inches. | 8 feet. | 62 feet 6 inches. | 24 feet. | 5 feet. |
| 7. Beam. | 3 feet. | 44 feet. | 51 feet. | 71 feet. | 2 feet. |
| 8. Depth. | 6 feet 6 inches. | 3 feet. | 14 feet. | 4 feet. | 10 inches. |
| 9. Draft (mean). | Triple cylinder; Imperial. | 4-cycle, 2-cylinder. | 14 by 20 by 24 inches; 2 sets. | None. | 3-cylinder (Ferro) gas engine. |
| 10. Type and size of engines. | 85-horsepower gas engine. | 16. | 150. | do. | 25. |
| 11. Approximate horsepower. | | None. | 96 inches diameter, 198 inches long, 80 3/4-inch tubes, 116 inches long, 170 pounds working pressure; Scotch marine dry-back type. | do. | None. |
| 12. Type and size of boilers. | | | | do. | Screw. |
| 13. Stern wheel, side wheel, or screw. | Screw. | Screw. | None. | do. | 9 persons. |
| 14. Accommodations..... | 50 passengers. | None. | 20. | do. | No lease. |
| 15. Date of beginning of lease. | No lease. | July 1, 1915. | Jan. 26, 1916. | July 1, 1915. | |
| 16. Time lease is to run. | | 18 months; lease terminated Dec. 31, 1916. | Mar. 11, 1916. | 18 months; lease terminated May 2, 1916. | |
| 17. Amount paid per month. | Hired as needed at hourly rate of \$3.25. | \$39. | \$180 per day. | \$100. | \$5 to \$7 per day. |
| 18. Amount paid during the calendar year. | \$27.65. | \$461.71. | \$6,039.54. | \$406.45. | \$535. |
| 19. Work performed. | Towing lighters between north and south jetties. | Survey launch, used in connection with dredging operations. | Repairing breaks in and supplementing levees used for equipping Imperial Tumpashore by United States dredges in Sacramento River. | Carrying fuel oil for use of United States dredges Sacramento and San Joaquin. | (1). |

| Remarks. | Remarks. |
|---|---|
| <p>! Not under formal lease.
! This rate included fuel, etc.
! Work performed July 10 to Aug. 26, 1916, inclusive, transporting survey party on Sacramento River; Aug. 28 to Dec. 2, 1916, inclusive, used in connection with building and repairing wing dams in Sacramento River.</p> | <p>! Has 4 rectangular steel tanks in hull; total capacity about 900 barrels.</p> |

TABLE XXIX.—*Floating plant rented during the calendar year ending Dec. 31, 1916—Continued.*

| San Francisco, Cal., first. | | San Francisco, Cal., third. | |
|---|--|---|--|
| 1. District..... | Willard C. | Grand Island No. 3..... | Yankee..... |
| 2. Name, letter, or number of vessel. | Pacific Engineering & Construction Co. | J. W. Hollenbeck..... | Oakland Launch & Tug-boat Co. |
| 3. Name of lessor (district or person). | Humboldt Bay..... | Sacramento River, opposite 3-mile slough. | Sacramento River..... |
| 4. Where operated. | Gasoline launch, wood..... | Nonpropelling, steel clam-shell dredge. | Oil barge, wood..... |
| 5. Type of vessel and material of hull. | 50 feet 8 inches..... | 140 feet..... | 71 feet..... |
| 6. Length..... | 12 feet 8 inches..... | 62 feet 6 inches..... | 24 feet..... |
| 7. Beam..... | 5 feet..... | 14 feet..... | 7 feet..... |
| 8. Depth..... | 6 feet 6 inches..... | 5 feet..... | 4 feet..... |
| 9. Draft (mean)..... | Triple cylinder; Imperial marine gas engine. | 14 by 20 by 24 inches; 2 sets. | None..... |
| 10. Type and size of engines. | 85..... | 150..... | 3-cylinder (Ferro) gas engine. |
| 11. Approximate horsepower. | None..... | 96 inches diameter, 198 inches long; 80 3/4-inch tubes, 156 inches long; 170 pounds working pressure. | 25..... |
| 12. Type and size of boilers. | Screw..... | Booth marine dry-back type. | None..... |
| 13. Stern wheel, slide wheel, or screw. | 50 passengers..... | None..... | Screw..... |
| 14. Accommodations..... | No lease..... | 20..... | 6 persons. |
| 15. Date of beginning of lease. | July 1, 1915..... | Jan. 28, 1916..... | No lease. ¹ |
| 16. Time lease is to run. | 18 months; lease terminated Dec. 31, 1916. | Mar. 11, 1916..... | 18 months; lease terminated May 2, 1916. |
| 17. Amount paid per month. | Hired as needed at hourly rate of \$3.25. | \$180 per day..... | \$100..... |
| 18. Amount paid during the calendar year. | \$77.63..... | \$6,039.54..... | \$3 to \$7 per day. ² |
| 19. Work performed..... | Towing lighters between north and south jetties. | Repairing breaks in and supplementing levee used for retaining material pumped ashore by United States dredges in Sacramento River. | \$535. |
| | | | (³). |

| Remarks. | Remarks. |
|---|---|
| <p>1 Has 4 rectangular steel tanks in hull; total capacity about 900 barrels.</p> | <p>1 Not under formal lease.
 1 This rate included fuel, etc.
 1 Work performed July 10 to Aug. 28, 1916, inclusive, transporting survey party on Sacramento River; Aug. 29 to Dec. 2, 1916, inclusive, used in connection with building and repairing wing dams in Sacramento River.</p> |

TABLE XXIX.—*Floating plant rented during the calendar year ending Dec. 31, 1916—Continued.*

| 1. District..... | | San Francisco, Cal., third. | | St. Louis, Mo., Mississippi River Commission. | |
|--|---|---|---|--|--|
| 2. Name, letter, or number of vessel. | Unmarked..... | Barge (no name)..... | Barge (no name)..... | Chalmette..... | Cincinnati. |
| 3. Name of lessor (district or person). | San Francisco Bridge Co. | P. A. Hart..... | C. H. Williams..... | Fourth, Mississippi River... | Cincinnati, Ohio, first district. |
| 4. Where operated..... | Sacramento River, vicinity of Rio Vista. | Sacramento River..... | Sacramento River..... | Carrollton, La..... | Wolf River diversion canal and Memphis harbor. |
| 5. Type of vessel and material of hull. | Wood, barge..... | Barge (wooden)..... | Barge (wooden)..... | Steam towboat; steel..... | Dipper dredge, steel. |
| 6. Length..... | 73 feet..... | 60 feet..... | 40 feet..... | 105 feet..... | 112 feet. |
| 7. Beam..... | 26 feet..... | 20 feet..... | 14 feet..... | 21 feet..... | 34 feet. |
| 8. Depth..... | 6 feet..... | 5 feet..... | 4 feet..... | 4 feet 6 inches..... | 6 feet 10 inches. |
| 9. Draft (me in)..... | 3 feet..... | 2 feet..... | 10 inches..... | None..... | Not known. |
| 10. Type and size of engines. | None..... | None..... | None..... | Do..... | Do. |
| 11. Approximate horsepower. | do..... | do..... | do..... | do..... | Do. |
| 12. Type and size of boilers. | do..... | do..... | do..... | Stern wheel..... | Do. |
| 13. Type of screw, or stern wheel, side wheel, or screw. | do..... | do..... | do..... | do..... | None. |
| 14. Accommodations. | do..... | do..... | do..... | Jan. 28, 1916..... | Apr. 1, 1916. |
| 15. Date of beginning of lease. | Oct. 1, 1915..... | Nov. 24, 1916..... | Aug. 30, 1916 ¹ | Feb. 9, 1916..... | To Dec. 1, 1916. |
| 16. Time lease is to run. | 15 months; lease terminated Dec. 31, 1916. | Dec. 4, 1916..... | Dec. 24, 1916..... | Nothing..... | \$306.75 (1 per cent original cost.) |
| 17. Amount paid per month. | \$30..... | \$3 per day..... | \$2 per day..... | do..... | \$6,908.65. ¹ |
| 18. Amount paid during the calendar year. | \$600..... | \$33..... | \$160..... | Used on discharge observations. | See Remarks. ² |
| 19. Work performed..... | Carrying machinery and supplies for dredges operating in Sacramento River, Cal. | Used in connection with building and repairing wing dams in Sacramento River. | Used in connection with building and repairing wing dams. | do..... | do..... |
| | | Remarks. | Remarks. | Remarks. | |
| | | ¹ Not under formal lease. | ¹ Not under formal lease. | ¹ Includes \$454.63 cost of towing dredge from Dam No. 39, Ohio River, to Cairo, Ill. | |
| | | | | ² Loaded 646 scows (capacity of scow 128 cubic yards.) Moved 206,191 cubic yards of material that was not loaded into scows. Used in digging Wolf River diversion canal and dredging in Memphis harbor. | |

| St. Louis, Mo. (Mississippi River Commission). | | | | |
|--|---|--|--|---|
| 1. District..... | 2. Name, letter, or number of vessel. | 3. Name of lessor (district or person). | 4. Where operated. | 5. Type of vessel and material of hull. |
| | Idler II. | Meramec. | Mark A. Morse. | Pirate No. 2. |
| | Thatcher B. Bean, Little Rock, Ark. | St. Louis, Mo. | Esso Towboat Co., New Orleans, La. | E. A. Batchelor & Sons, Muscatine, Iowa. |
| | Arkansas River, Little Rock, Ark. | Columbus, Ky. | New Orleans, La. | Vicinity Muscatine, Iowa. |
| | Gasoline launch: wood | Tug and survey boat. | Steam tug. | Gasoline motor boat; wood. |
| | 30 feet. | 118 feet 3 inches. | 60 feet. | 40 feet. |
| | 7 feet. | 24 feet. | 5 feet 6 inches. | 5 feet 6 inches. |
| | 5 feet. | 4 feet 3 inches. | 3 feet. | 3 feet. |
| | 26 inches. | 4 feet 11 inches. | 2 feet. | 7 feet 6 inches. |
| | 3 cylinders, 5½ by 6½ inches. | 2 Mississippi River, 12 inch by 5 foot stroke. | Two 8 by 8 inches. | 3 feet 10 inches. |
| | 15. | 220. | | Two 15 by 54 inches noncondensing. |
| | 11. Approximate horsepower. | | | Not known. |
| | 12. Type and size of boilers. | 1 Mississippi River, 42 inches by 24 feet. | | 2 gunboat. |
| | 13. Stern wheel, side wheel, or screw. | Stern wheel. | | Stern wheel. |
| | 14. Accommodations. | 20. | | 28. |
| | 15. Date of beginning of lease. | Jan. 31, 1916. | Feb. 9, 1916 (no lease; hired by day). | Jan. 19, 1916. |
| | 16. Time lease is to run. | To Feb. 12, 1916. | 29 days (to Mar. 9, 1916). | To June 30, 1916. |
| | 17. Amount paid per month. | Nothing. | \$25 per day ¹ . | Nothing. |
| | 18. Amount paid during the calendar year. | \$132. | \$737.50. | \$1,320 ¹ . |
| | 19. Work performed. | Used on discharge observations. | Used on discharge observations. | See Remarks. ¹ |
| | | Remarks. ¹ | Remarks. | Remarks. |
| | | ¹ Includes fuel and services of crew. | ¹ Includes fuel and services of crew. | ¹ Charge for towing dredge from New Orleans, La., to West Memphis, Ark.
² Moved 64,051 cubic yards material from Wolf River diversion canal: 22,820 cubic yards material from Memphis Harbor. Used in digging Wolf River diversion canal and dredging in Memphis Harbor. |

| 1. District..... | Third Mississippi River. | | | | Wheeling, W. Va. | |
|---|------------------------------------|------------------------------------|------------------------------------|--|--|--|
| | 23; 40..... | 210; 217; 221; 506..... | 1; 2..... | Eclipse..... | P. M. S. Co. | Partersburg & Marietta Sand Co. |
| 2. Name, letter, or number of vessel..... | Union Sand & Material Co. | Miller Engineering Co. | Aluminum Ore Co. | Anthony Swinger | Dams Nos. 19 and 21, Ohio River. | Dams Nos. 19 and 21, Ohio River. |
| 3. Name of lessor (district or person)..... | Mississippi River and tributaries. | Mississippi River and tributaries. | Mississippi River and tributaries. | | | |
| 4. Where operated..... | | | | | | |
| 5. Type of vessel and material of hull. | | | | | | |
| 6. Length..... | 130 feet. | 100 feet. | 175 feet. | Gasoline towboat; wood. | Combination derrick and bucket dredge, wood. | Combination derrick and bucket dredge, wood. |
| 7. Beam..... | 30 feet. | 26 feet. | 40 feet. | 83 feet. | 56 feet 6 inches. | 56 feet 6 inches. |
| 8. Depth..... | 7 feet. | 6 feet. | 8 feet. | 12 feet 6 inches. | 33 feet. | 33 feet. |
| 9. Draft (mean)..... | | | | 1 foot 2 inches. | 4 feet. | 4 feet. |
| 10. Type and size of engines | | | | 1 foot 4 inches. | 17 inches. | 17 inches. |
| | | | | Fairbanks Morse, 11½ by 18 inches, swing 6 inches by 8 inches. | 3-drum Lidgerwood, 9 by 10 inches, swing 6 inches by 8 inches. | 3-drum Lidgerwood, 9 by 10 inches, swing 6 inches by 8 inches. |
| 11. Approximate horsepower. | | | | 32. | 30. | 30. |
| 12. Type and size of boilers. | | | | No boilers. | Fire-box tubular. | Fire-box tubular. |
| 13. Stern wheel, side wheel, or screw. | | | | Stern wheel. | | |
| 14. Accommodations. | | | | For 4 people. | 2 sleeping rooms. | 2 sleeping rooms. |
| 15. Date of beginning of lease. | | | | July 1, 1916. | July 31, 1916. | July 31, 1916. |
| 16. Time lease is to run. | | | | June 13, 1917. | Dec. 31, 1916. | Dec. 31, 1916. |
| 17. Amount paid per month. | \$375. | \$250. | \$500. | | \$250. | \$250. |
| 18. Amount paid during the calendar year. | \$750. | \$500. | \$1,226.76. | | \$1,020.71. | \$1,448.43. |
| 19. Work performed..... | Gravel service. | Gravel service. | Gravel service. | (1). | (1). | (1). |
| | | Remarks.
1 Including crew. | | Remarks.
1 Towing sand, gravel, and cement flats, etc., in connection with construction of Dams Nos. 19 and 21, Ohio River. | Remarks.
1 Filling and banking of coniferdam, etc., in construction of Dams Nos. 19 and 21, Ohio River. | Remarks.
1 Filling and banking of coniferdam, etc., in construction of Dams Nos. 19 and 21, Ohio River. |

TABLE XXIX.—*Floating plant rented during the calendar year ending Dec. 31, 1916—Continued.*

| 1. District..... | | Wheeling, W. Va. | | Wilmington, N. C. | |
|--|---|---|--------------------------------------|---|--|
| 2. Name, letter, or number of vessel. | See 1. (on) | St. Dennis..... | Lucy..... | Sanders..... | St. Charles. |
| 3. Name of lessor (district or person). | The Kentucky Towboat Co. | Arthur Clarence Ritchie..... | A. E. Pittmann & Son..... | Wilmington Towing Co. and W. A. Sanders. | A. F. Doane, Jr. |
| 4. Where operated..... | Ohio River (see remarks).... | Dam No. 22, Ohio River..... | Neuse River, N. C..... | Cape Fear River, N. C..... | Various rivers and harbors in Newbern (N. C.) subdistrict. |
| 5. Type of vessel and material of hull. | Towboat, paddle; wood..... | Towboat, paddle, gasoline; wood. | Gasoline launch; wood..... | Gasoline launch; wooden hull. | Gas schooner; wood. |
| 6. Length..... | 120 feet..... | 60 feet 4 inches..... | 24 feet..... | 44 feet..... | 49 feet 6 inches. |
| 7. Beam..... | 21 feet..... | 15 feet 4 inches..... | 5 feet..... | 9 feet..... | 15 feet 4 inches. |
| 8. Depth..... | 3 feet 8 inches..... | 2 feet..... | 3 feet..... | 2 feet 9 inches..... | 5 feet 1 inch. |
| 9. Draft (mean)..... | 2 feet 8 inches..... | 12 inches..... | 2 feet 6 inches..... | 3 feet 6 inches..... | 5 feet. |
| 10. Type and size of engines. | 2 noncondensing, 124 inches diameter, 4-foot stroke. | 2-cylinder, 4-cycle..... | 2-cylinder, 4-cycle, automatic. | Lathrop High Duty, 2-cylinder, $\frac{7}{8}$ inch by 8 inch stroke. | 2-cylinder, 4-cycle, automatic. |
| 11. Approximate horsepower. | 310..... | 25..... | 12..... | 24..... | 50. |
| 12. Type and size of boilers. | Two 38 inches diameter, 22 feet long; six 6-inch flues. | None..... | None..... | None..... | None. |
| 13. Stern wheel, side wheel, or screw. | Stern wheel..... | Stern wheel..... | Screw..... | Screw..... | Screw. |
| 14. Accommodations..... | 12 people, 6 staterooms..... | For crew of 2..... | None..... | Sleeping accommodations for 2 persons. | 2 men. |
| 15. Date of beginning of lease. | Sept. 18, 1915, and July 1, 1916..... | July 31, 1916..... | Feb. 29, 1912..... | 1 Jan. 1, 1916; 1 Dec. 1, 1916. | Aug. 1, 1916. |
| 16. Time lease is to run..... | June 30, 1917..... | Until June 30, 1917..... | Indefinite; terminated Mar. 4, 1916. | 1 expired Apr. 15, 1916; 1 to expire Mar. 1, 1917. | 5 months; terminated Dec. 16, 1916. |
| 17. Amount paid per month. | \$37.50 per diem (12 hours).... | \$15 per diem when boat is used. | \$28..... | 1 lease \$75, 1 lease \$50..... | \$75. |
| 18. Amount paid during the calendar year. | \$4,571.88..... | \$277.50..... | \$53.23..... | \$380.24..... | \$375. |
| 19. Work performed..... | (1)..... | (1)..... | Tender to dredge Croatan..... | Tender for dredge Henry Bacon. | Tender to dredge Croatan. |
| Remarks. | | Remarks. | | Remarks. | |
| 1. Towing scows and flats containing coal, sand, and gravel, cement, lumber, and material dredged, etc., in construction work at Demas No. 10, 17, 19, 21, and 22, Ohio River. | | 1. Towing flats of construction material, sand and gravel, coal, etc. Employed in construction of Dam No. 22, Ohio River. | | | |

TABLE XXX.

WIRELESS EQUIPMENT.

4823

TABLE XXX.—Wireless equipment.

| District..... | Portland, Oreg., first. |
|---|--|
| 1. Name of vessel..... | Col. P. S. Michie. |
| 2. Type of vessel..... | Seagoing hopper dredge. |
| 3. Official call letters..... | N Z O. |
| 4. Power of equipment in kilowatts..... | 1. |
| 5. Make..... | (1) |
| 6. Address of manufacturer..... | Chelsea, Mass. |
| 7. When installed..... | 1916. |
| 8. Radius of action..... | 100 miles. |
| 9. Cost of equipment, complete, as installed..... | \$225. |
| | Remarks. |
| | ¹ The set is made up of instruments built for amateur use. The sending set is mostly Murdock Co. instruments, a De Forest audion is used for receiving. An auxiliary spark coil sending set operated by a storage battery is provided and has a radius of 10 miles. The instruments were purchased separately and were installed by the crew. |

TABLE XXXI.

**FLOATING PLANT CONSTRUCTED AND PLANT
IN COMMISSION.**

TABLE XXXI.—*Floating plant constructed and placed in commission during the calendar year ending December 31, 1916.*

| District..... | Chattanooga, Tenn. | | | | | Chicago, Ill. | | | | |
|--|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| 1. Name, letter, or number | No. 29 | No. 30 | No. 31 | No. 32, No. 33, No. 34 | No. 35 | No. 36 | No. 37 | No. 38 | No. 39 | No. 40 |
| 2. Where built..... | Williams Shoals, Tennessee | Williams Shoals, Tennessee | Williams Shoals, Tennessee | Chattanooga, Tenn. | Chattanooga, Tenn. | Coulter Island Shoals..... | Chattanooga, Tenn. | Chattanooga, Tenn. | Chattanooga, Tenn. | Chattanooga, Tenn. |
| 3. Builder and material of hull..... | U. S. Engineer Department; wood | U. S. Engineer Department; wood | U. S. Engineer Department; wood | U. S. Engineer Department; wood | U. S. Engineer Department; wood | U. S. Engineer Department; wood | U. S. Engineer Department; wood | U. S. Engineer Department; wood | U. S. Engineer Department; wood | U. S. Engineer Department; wood |
| 4. Type..... | Drill raft | Drill raft | Drill raft | Drill raft | Drill raft | Drill raft | Drill raft | Drill raft | Drill raft | Drill raft |
| 5. Length..... | Each 31 feet | Each 31 feet | Each 31 feet | Each 31 feet | Each 31 feet | Each 31 feet | Each 31 feet | Each 31 feet | Each 31 feet | Each 31 feet |
| 6. Beam..... | Each 17 feet 8 inches | Each 17 feet 8 inches | Each 17 feet 8 inches | Each 17 feet 8 inches | Each 17 feet 8 inches | Each 17 feet 8 inches | Each 17 feet 8 inches | Each 17 feet 8 inches | Each 17 feet 8 inches | Each 17 feet 8 inches |
| 7. Depth..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 8. Contract cost or estimated cost..... | \$200.00 | \$200.00 | \$200.00 | \$200.00 | \$200.00 | \$200.00 | \$200.00 | \$200.00 | \$200.00 | \$200.00 |
| 9. Completed cost ready for service..... | \$197.29 | \$199.68 | \$199.67 | \$199.68 | \$199.68 | \$199.68 | \$199.68 | \$199.68 | \$199.68 | \$199.68 |
| 10. Contract or estimated time to build..... | 12 days | 12 days | 12 days | 12 days | 12 days | 12 days | 12 days | 12 days | 12 days | 12 days |
| 11. Actual time to build..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| District..... | Chicago, Ill. | | | | | Cincinnati, Ohio, first. | | | | |
| 1. Name, letter, or number | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | No. 9 | No. 10 |
| 2. Where built..... | La Salle, Peoria, Ill. | La Salle, Peoria, Ill. | La Salle, Peoria, Ill. | La Salle, Peoria, Ill. | La Salle, Peoria, Ill. | La Salle, Peoria, Ill. | La Salle, Peoria, Ill. | La Salle, Peoria, Ill. | La Salle, Peoria, Ill. | La Salle, Peoria, Ill. |
| 3. Builder and material of hull..... | United States; wood | United States; wood | United States; wood | United States; wood | United States; wood | United States; wood | United States; wood | United States; wood | United States; wood | United States; wood |
| 4. Type..... | Power skiff | Power skiff | Power skiff | Power skiff | Power skiff | Power skiff | Power skiff | Power skiff | Power skiff | Power skiff |
| 5. Length..... | 22 feet | 22 feet | 22 feet | 22 feet | 22 feet | 22 feet | 22 feet | 22 feet | 22 feet | 22 feet |
| 6. Beam..... | 4 feet 6 inches | 4 feet 6 inches | 4 feet 6 inches | 4 feet 6 inches | 4 feet 6 inches | 4 feet 6 inches | 4 feet 6 inches | 4 feet 6 inches | 4 feet 6 inches | 4 feet 6 inches |
| 7. Depth..... | 1 foot 3 inches | 1 foot 3 inches | 1 foot 3 inches | 1 foot 3 inches | 1 foot 3 inches | 1 foot 3 inches | 1 foot 3 inches | 1 foot 3 inches | 1 foot 3 inches | 1 foot 3 inches |
| 8. Contract cost or estimated cost..... | \$255 | \$255 | \$255 | \$255 | \$255 | \$255 | \$255 | \$255 | \$255 | \$255 |
| 9. Completed cost ready for service..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 10. Contract or estimated time to build..... | 2 months | 2 months | 2 months | 2 months | 2 months | 2 months | 2 months | 2 months | 2 months | 2 months |
| 11. Actual time to build..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

| District..... | Cincinnati, Ohio, second. | Dallas, Tex. | Duluth, Minn. |
|--|--|--------------------|---|
| 1. Name, letter, or number | Nos. 57, 58, and 59 | No. 6 | Dipper dredge Col. D. D. (Gallard). |
| 2. Where built | Frankfort, Ky. | Galveston, Tex. | Green Bay, Wis. |
| 3. Builder and material of hull | U. S. Engineer Department; steel. | J. J. Kane; steel. | Hartmann-Grelling Co.; steel. |
| 4. Type | Needle boat | Oil barge. | Dipper dredge. |
| 5. Length | 51 feet. | 80 feet | 116 feet. |
| 6. Beam | 10 feet. | 20 feet | 40 feet. |
| 7. Depth | 2 feet 2 inches | 5 feet 9 inches | Dipper end, 11 feet 6 inches; after end, 9 feet 6 inches. |
| 8. Contract cost or estimated cost. | Nos. 57 and 58, \$1,250; No. 59, \$2,145. | \$9,960 | \$108,184. |
| 9. Completed cost ready for ser. ice. | No. 57, \$1,191.31; No. 58, \$1,142.25; No. 59, \$1,432.54. | \$9,960 | \$112,685.48. |
| 10. Contract or estimated time to build. | 2 months. | 5 months 27 days. | 10 months. |
| 11. Actual time to build | Nos. 57 and 58, 4 months; 59, 3 months. ¹ | 7 months 6 days. | 14 months. |
| | Remarks.
¹ Construction of boats interfered with by more important work. | | |
| | Remarks.
Authority, E. D. 7083/161. Design changed from steel to wood; authority, E. D. 7083/170. | | |

TABLE XXXI.—*Floating plant constructed and placed in commission during the calendar year ending December 31, 1916—Continued.*

| District..... | Duluth, Minn. | | Galveston. | | |
|--|---|---|------------------------------|--|--|
| | 11..... | 12..... | Cavalo..... | Copano..... | Lavaca..... |
| 1. Name, letter, or number | Ferryburg, Mich. | Ferryburg, Mich. | Galveston, Tex. | Galveston, Tex. | Galveston, Tex. |
| 2. Where built | Johnston Bros., steel | Johnston Bros., steel | U. S. Engineer Department; | U. S. Engineer Department; | U. S. Engineer Department; |
| 3. Builder and material of hull | | | wood. | wood. | wood. |
| 4. Type | Dump scow | Dump scow | Gasoline launch (screw) | Gasoline launch (screw) | Gasoline launch (screw) |
| 5. Length | 125 feet 8 inches | 125 feet 8 inches | 39 feet 10 inches | 28 feet 6 inches | 28 feet |
| 6. Beam | 31 feet 6 inches | 31 feet 6 inches | 8 feet 10 inches | 7 feet | 6 feet 1 inch |
| 7. Depth | 12 feet | 12 feet | 5 feet 9 inches | 4 feet 4 inches | 2 feet |
| 8. Contract cost or estimated cost. | \$25,525. | \$25,525. | \$5,911.85 | | |
| 9. Completed cost ready for service. | \$25,525. | \$25,525. | | \$1,425.89 | \$1,087.91. |
| 10. Contract or estimated time to build. | 5 months. | 5 months. | 10 months | 3 months. | 3 months. |
| 11. Actual time to build | 11 months. | 11 months. | | | |
| | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> |
| | Delivered in Duluth-Superior Harbor during close of season of navigation; no expenditures on or operation of, this scow during the year except for trial. | Delivered in Duluth-Superior Harbor during close of season of navigation; no expenditures on or operation of, this scow during the year except for trial. | Tender for dredge Guadalupe. | Tender for dredge San Jacinto. Built aboard dredge from Brooks frames. | Tender for dredge Sam Houston. Built aboard the dredge from Brooks frames. |

| District..... | Galveston, Tex. | | | | Grand Rapids, Mich. |
|--|--------------------------------------|---|-----------------------------------|--|---|
| 1. Name, letter, or number. | Mesquite..... | Mustang..... | Neuoes..... | Palacios..... | Hancock No. 2. |
| 2. Where built..... | Wareham, Mass. | Galveston, Tex. | St. Louis, Mo. | Galveston, Tex. | Detroit, Mich. |
| 3. Builder and material of hull. | Cape Cod Power Dory Co.; wood. | U. S. Engineer Department; wood. | St. Louis Yacht & Boat Co.; wood. | U. S. Engineer Department; wood. | U. S. Lake Survey office; wood. |
| 4. Type..... | Gasoline launch (screw)..... | Gasoline launch (screw)..... | Gasoline launch (screw)..... | Gasoline launch (screw)..... | Gasoline launch (screw). |
| 5. Length..... | 30 feet 6 inches..... | 20 feet..... | 31 feet..... | 26 feet 6 inches..... | 16 feet. |
| 6. Beam..... | 7 feet 4 inches..... | 5 feet 2 inches..... | 8 feet..... | 7 feet..... | 6 feet. |
| 7. Depth..... | 3 feet 6 inches..... | 2 feet..... | 3 feet..... | 5 feet 10 inches..... | 2 feet 4 inches. |
| 8. Contract cost or estimated cost. | \$1,734..... | \$750..... | \$1,050..... | \$1,492.44..... | \$207.23. |
| 9. Completed cost ready for service. | \$1,734..... | | | | \$207.23. |
| 10. Contract or estimated time to build. | | 2 months..... | | 3 months..... | 2 months. |
| 11. Actual time to build. | | | | | Do. |
| | Remarks.
Tender for survey party. | Remarks.
Tender for dredge Comstock. | Remarks.
Inspection boat. | Remarks.
Tender for dredge Col. A. M. Miller. Built aboard the dredge from Brooks frames. | Remarks.
The U. S. Lake Survey office furnished material and labor and built boat. |

TABLE XXXI.—Floating plant constructed and placed in commission during the calendar year ending December 31, 1916—Continued.

| District..... | Jacksonville, Fla. | | | Kansas City, Mo. | |
|--|---|--|---|--------------------------|--------------------------|
| 1. Name, letter, or number..... | B-4..... | B-5..... | Nassau..... | Bon Homme..... | Whetstone..... |
| 2. Where built..... | Tampa, Fla..... | Tampa, Fla..... | Dames Point, Fla..... | Gasconade, Mo..... | Gasconade, Mo..... |
| 3. Builder and material of hull..... | Tampa Steam Ways Co.; wood..... | Tampa Steam Ways Co.; wood..... | Julius Olsen; wood..... | United States; wood..... | United States; wood..... |
| 4. Type..... | Fuel barge..... | Derrick barge..... | Gasoline launch..... | Motor launch..... | Motor launch..... |
| 5. Length..... | 65 feet..... | 50 feet..... | 21 feet 94 inches..... | 21 feet 7 inches..... | 24 feet..... |
| 6. Beam..... | 22 feet..... | 17 feet..... | 7 feet 1 inch..... | 4 feet 11 inches..... | 5 feet 5 inches..... |
| 7. Depth..... | 6 feet..... | 5 feet..... | 3 feet 10 inches..... | 2 feet 6 inches..... | 1 foot 10 inches..... |
| 8. Contract cost or estimated cost..... | \$1,938..... | \$1,390..... | \$400 (estimated)..... | ..... | ..... |
| 9. Completed cost ready for service..... | \$1,938..... | \$1,390..... | \$397.14..... | \$241.43..... | \$378.08..... |
| 10. Contract or estimated time to build..... | 40 days..... | ..... | ..... | ..... | ..... |
| 11. Actual time to build..... | do..... | 21 days..... | 22 days..... | 15 days..... | No record..... |
| | <i>Remarks.</i>
Used as a fuel barge for the U. S. dredge Barnard. | <i>Remarks.</i>
Used as derrick barge for the dredge Barnard. | <i>Remarks.</i>
Used as survey boat on the St. Johns River, Jacksonville to the ocean, and on the channel between St. Johns River and Cumberland Sound, Ga. and Fla. | | |

| Kansas City, Mo. | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| District..... | No. 32..... | No. 33..... | No. 34..... | No. 35..... | No. 36..... |
| 1. Name, letter, or number..... | Gasconade, Mo..... | Gasconade, Mo..... | Gasconade, Mo..... | Gasconade, Mo..... | Gasconade, Mo..... |
| 2. Where built..... | United States; wood..... | United States; wood..... | United States; wood..... | United States; wood..... | United States; wood..... |
| 3. Builder and material of hull..... | Pontoon..... | Pontoon..... | Pontoon..... | Pontoon..... | Pontoon..... |
| 4. Type..... | 22 feet..... | 22 feet..... | 22 feet..... | 19 feet 6 inches..... | 19 feet 6 inches..... |
| 5. Length..... | 7 feet..... | 7 feet..... | 7 feet..... | 7 feet..... | 7 feet..... |
| 6. Beam..... | 3 feet..... | 3 feet..... | 3 feet..... | 2 feet 10 inches..... | 2 feet 10 inches..... |
| 7. Depth..... | | | | | |
| 8. Contract cost or estimated cost..... | \$80.44..... | \$80.44..... | \$80.44..... | No record..... | No record..... |
| 9. Completed cost ready for service..... | | | | | |
| 10. Contract or estimated time to build..... | 40 days..... | 40 days..... | 40 days..... | No record..... | 30 days..... |
| 11. Actual time to build..... | | | | | |

| Kansas City, Mo. | | | | | |
|--|--------------------------|--|--------------------------|------------------------------------|---|
| District..... | No. 37..... | No. 38..... | No. 39..... | No. 40..... | No. 41..... |
| 1. Name, letter, or number..... | Glasgow, Mo..... | Lupus, Mo..... | Gasconade, Mo..... | Lupus, Mo..... | Frederick, Mo..... |
| 2. Where built..... | United States; wood..... | United States; wood..... | United States; wood..... | United States; wood..... | Frank Tillman; wood..... |
| 3. Builder and material of hull..... | Pontoon..... | Pontoon..... | Pontoon..... | Pontoon..... | Pontoon..... |
| 4. Type..... | 25 feet 6 inches..... | 30 feet..... | 22 feet..... | 22 feet..... | 18 feet..... |
| 5. Length..... | 6 feet 6 inches..... | 6 feet 6 inches..... | 7 feet..... | 7 feet..... | 8 feet..... |
| 6. Beam..... | 2 feet 2 inches..... | 2 feet 9 inches..... | 3 feet..... | 3 feet..... | 1 foot 4 inches..... |
| 7. Depth..... | | | | | \$35..... |
| 8. Contract cost or estimated cost..... | No record..... | No record..... | No record..... | No record..... | \$35..... |
| 9. Completed cost ready for service..... | | | | | No record..... |
| 10. Contract or estimated time to build..... | No record..... | No record..... | No record..... | No record..... | No record..... |
| 11. Actual time to build..... | | | | | Do..... |
| | | Remarks..... | | Remarks..... | Remarks..... |
| | | Constructed by field party while in field. | | Brift by party while in the field. | Purchased by survey party while in the field. |

TABLE XXXI.—*Floating plant constructed and placed in commission during the calendar year ending Dec. 31, 1916—Continued.*

| District..... | Kansas City, Mo. | | | | | |
|--|--------------------------|--------------------------|--|--------------------------|--------------------------|--|
| 1. Name, letter, or number | No. 113..... | No. 119..... | No. 120..... | No. 121..... | No. 122..... | |
| 2. Where built..... | Gasconade, Mo..... | Gasconade, Mo..... | Osage River,
United States; wood..... | Gasconade, Mo..... | Gasconade, Mo..... | |
| 3. Builder and material of hull. | United States; wood..... | United States; wood..... | United States; wood..... | United States; wood..... | United States; wood..... | |
| 4. Type..... | Strif..... | Strif..... | Strif..... | Strif..... | Strif..... | |
| 5. Length..... | 20 feet..... | 19 feet 6 inches..... | 18 feet..... | 19 feet 6 inches..... | 19 feet 6 inches..... | |
| 6. Beam..... | 5 feet..... | 4 feet 4 inches..... | 4 feet 3 inches..... | 4 feet 4 inches..... | 4 feet 4 inches..... | |
| 7. Depth..... | 1 foot 2 inches..... | 1 foot 2 inches..... | 1 foot 3 inches..... | 1 foot 2 inches..... | 1 foot 2 inches..... | |
| 8. Contract cost or estimated cost. | No record..... | \$28.87..... | \$40 (estimated)..... | No record..... | No record..... | |
| 9. Completed cost ready for service. | | | | | | |
| 10. Contract or estimated time to build. | No record..... | 5 days..... | 6 days..... | 5 days..... | 6 days..... | |
| 11. Actual time to build... | | | | | | |

FLOATING PLANT.

4833

| District..... | Kansas City, Mo. | Louisville, Ky. | Mississippi River, first and second districts, Memphis, Tenn. | Mobile, Ala. |
|--|--------------------------|---|--|--|
| 1. Name, letter, or number | No. 123. | Nolin River..... | 1501..... | No. 29. |
| 2. Where built..... | Gasconade, Mo..... | Hull, Pittsburgh, Pa.; house, Louisville, Ky. | Memphis, Tenn., wood | Tuscaloosa, Ala. |
| 3. Builder and material of hull..... | United States; wood..... | The Dravo Contracting Co.; steel. | U. S. Gov't fleet, creosoted. | United States; steel. |
| 4. Type..... | Skiff..... | Dipper dredge..... | Mattress barge. | Deck barge. |
| 5. Length..... | 19 feet 6 inches..... | 88 feet 8 inches..... | 126 feet..... | 100 feet 4 inches. |
| 6. Beam..... | 4 feet 4 inches..... | 30 feet 8 inches..... | 40 feet..... | 27 feet. |
| 7. Depth..... | 1 foot 2 inches..... | 6 feet..... | 4 feet..... | 7 feet. |
| 8. Contract cost or estimated cost..... | No record..... | \$9,375 (hull)..... | \$6,500..... | \$7,000. |
| 9. Completed cost ready for service..... | No record..... | \$28,314.03..... | \$6,992.02 1..... | \$9,529.91. |
| 10. Contract or estimated time to build..... | 6 days..... | 100 days (hull)..... | 5 months..... | 10 months 20 days (work not continuous). |
| 11. Actual time to build..... | | 7 months (complete)..... | 5 months..... | |
| | | | Remarks. | Remarks. |
| | | | Cost as constructed for experimental concrete mat construction. These barres changed for willow-mat construction at an additional cost each of \$1,042.50. | Original estimate was based on a barge 5 feet deep, with $\frac{1}{2}$ -inch plates on bottom and 4-inch plates on top, with 4-inch plates on deck and gunwale. Plans as finally approved show barge 7 feet deep, with $\frac{1}{2}$ -inch plates on bottom and 4-inch plates on top, with 4-inch plates on deck and gunwales. |

TABLE XXXI.—*Floating plant constructed and placed in commission during the calendar year ending Dec. 31, 1916—Continued.*

| District..... | Kansas City, Mo. | | | | | |
|--|----------------------------|----------------------------|---|----------------------------|----------------------------|--|
| | No. 118.
Gasconade, Mo. | No. 119.
Gasconade, Mo. | No. 120.
Osage City, Mo. (Osage River).
United States; wood | No. 121.
Gasconade, Mo. | No. 122.
Gasconade, Mo. | |
| 1. Name, letter, or number | | | | | | |
| 2. Where built..... | United States; wood | United States; wood | United States; wood | United States; wood | United States; wood | |
| 3. Builder and material of hull..... | Shift. | Shift. | Shift. | Shift. | Shift. | |
| 4. Type..... | 20 feet. | 19 feet 6 inches. | 18 feet. | 19 feet 6 inches. | 19 feet 6 inches. | |
| 5. Length..... | 5 feet. | 4 feet 4 inches. | 4 feet 3 inches. | 4 feet 4 inches. | 4 feet 4 inches. | |
| 6. Beam..... | 1 foot 2 inches. | 1 foot 2 inches. | 1 foot 3 inches. | 1 foot 2 inches. | 1 foot 2 inches. | |
| 7. Depth..... | | | \$40 (estimated). | | | |
| 8. Contract cost or estimated cost. | No record | \$23.37 | \$33.16 | No record | No record | |
| 9. Completed cost ready for service. | | | | | | |
| 10. Contract or estimated time to build. | No record | 5 days | 6 days | 5 days | 6 days | |
| 11. Actual time to build..... | | | | | | |

FLOATING PLANT.

4833

| District..... | Kansas City, Mo. | Louisville, Ky. | Mississippi River, first and second districts, Memphis, Tenn. | Mobile, Ala. |
|--|--------------------------|---|--|---|
| 1. Name, letter, or number | No. 123..... | Nolin River..... | 1501..... | No. 29..... |
| 2. Where built..... | Ossage, Mo..... | Hull, Pittsburgh, Pa.; house, Louisville, Ky. | Memphis, Tenn., wood | Tusculooza, Ala. |
| 3. Builder and material of hull..... | United States; wood..... | The Dravo Contracting Co.; steel. | U. S. Gov't float, creosoted. | United States; steel. |
| 4. Type..... | Skiff..... | Dipper dredge..... | Mattress barge. | Dock barge. |
| 5. Length..... | 19 feet 6 inches..... | 88 feet 8 inches..... | 126 feet..... | 100 feet 4 inches. |
| 6. Beam..... | 4 feet 4 inches..... | 30 feet 8 inches..... | 40 feet..... | 24 feet. |
| 7. Depth..... | 1 foot 2 inches..... | 6 feet 6 inches..... | 4 feet..... | 7 feet. |
| 8. Contract cost or estimated cost..... | No record..... | \$6,375 (hull)..... | \$6,500..... | \$7,000. |
| 9. Completed cost ready for service..... | No record..... | \$28,514.05..... | \$6,992.02 1..... | \$9,529.91. |
| 10. Contract or estimated time to build..... | 6 days..... | 100 days (hull)..... | 5 months..... | 10 months 20 days (work not continuous). |
| 11. Actual time to build..... | 6 days..... | 7 months (complete)..... | 5 months..... | 10 months 20 days (work not continuous). |
| | | | Remarks. | Remarks. |
| | | | 1 Cost as constructed for experimental concrete mat construction. These barges changed for willow-mat construction at an additional cost each of \$1,042.50. | Original estimate was based on a barge 5 feet deep, with 4-inch plates on bottom and 4-inch plates on bottom and 4-inch plates for deck and gunwale. Plans as finally approved show barge 7 feet deep, with 4-inch plates on bottom and 4-inch plates on bottom and 4-inch plates on deck and gunwales. |

TABLE XXXI.—*Floating plant constructed and placed in commission during the calendar year ending Dec. 31, 1916—Continued.*

| District..... | Nashville, Tenn. | | | New Orleans, La. | | | Second New York. |
|--|----------------------------------|----------------------------------|--|--|-------------------------------------|--|------------------------|
| 1. Name, letter, or number. | No. 5..... | No. 6..... | Chouquique..... | No. 6..... | Drift. | | |
| 2. Where built..... | Lock A, Cumberland River. | Lock A, Cumberland River. | Keystone Lock, Bayou Teche, La. | Keystone Lock, Bayou Teche, La. | Brooklyn, N. Y. | | |
| 3. Builder and material of hull. | U. S. Engineer Department, wood. | U. S. Engineer Department, wood. | Engineer Department (hired labor), wood. | Engineer Department (hired labor), wood. | Wood. | | |
| 4. Type..... | Screw..... | Screw..... | Quarterboat..... | Fuel barge..... | Gasoline launch (screw). | | |
| 5. Length..... | 73 feet 7 inches | 73 feet 7 inches | 27 feet 10 inches | 35 feet | 18 feet. | | |
| 6. Beam..... | 20 feet 8 inches | 20 feet 8 inches | 28 feet 7 inches | 14 feet | 5 feet. | | |
| 7. Depth..... | 5 feet 9 inches. | 5 feet 9 inches. | 4.3 feet | 4 feet | 1 foot. | | |
| 8. Contract cost or estimated cost. | \$3,500. | \$3,500. | | | \$599. | | |
| 9. Completed cost ready for service. | \$2,543. | \$2,862. | \$3,000. | \$700. | \$399. | | |
| 10. Contract or estimated time to build. | 2 months. | 3 months. | 60 days. | 45 days. | | | |
| 11. Actual time to build. | | | | | | | |
| District..... | Pittsburgh, Pa. | | | First, Portland, Ore. | | | Second, Portland, Ore. |
| 1. Name, letter, or number. | Miffin..... | No. 1..... | No. 4..... | Callo..... | No. 9. | | |
| 2. Where built..... | Camden, N. J. | Lock 4, Pa..... | Lock 4, Pa..... | Big Eddy, Ore. | Government moorings, Portland, Ore. | | |
| 3. Builder and material of hull. | Mathis Yacht Building Co., wood. | United States, wood. | United States, wood. | U. S. Engineers, wood. | U. S. Engineer Department. | | |
| 4. Type..... | Gasoline launch (screw). | Derrick boat. | Derrick boat. | Suction dredge..... | 85-ton fuel barge. | | |
| 5. Length..... | 70 feet 10 inches | 70 feet. | 70 feet. | 70 feet. | 68 feet 6 inches. | | |
| 6. Beam..... | 15 feet. | 32 feet. | 32 feet. | 22 feet. | 24 feet 6 inches. | | |
| 7. Depth..... | 3 feet 10 inches | 3 feet 8 inches | 3 feet 8 inches | 4 feet 4 inches | 4 feet. | | |
| 8. Contract cost or estimated cost. | \$19,350. | \$6,500. | \$7,000. | \$3,000. | \$2,500. | | |
| 9. Completed cost ready for service. | \$19,812.90. | \$6,423. | \$7,581. | \$2,585.15. | \$2,126. | | |
| 10. Contract or estimated time to build. | 3 months. | 3 months. | 6 months. | 3 months. | 60 days. | | |
| 11. Actual time to build..... | 10 months 24 days. | 3 months. | | 75 days. | 64 days. | | |
| Remarks. | | | | | | | |
| The extraordinary delay in construction was due to the substitution of the Murray & Woodruff engines for engines contracted for. | | | | | | | |
| New hull was constructed and the machinery and other equipment removed from dredge Wallowa and installed thereon. | | | | | | | |

| San Francisco, Cal., first. | | Mississippi River, third. | |
|--|--|--|--|
| District..... | | | |
| 1. Name, letter, or number | San Pablo..... | 071..... | 1009..... |
| 2. Where built..... | Baltimore, Md..... | Vicksburg, Miss..... | Vicksburg, Miss..... |
| 3. Builder and material of hull..... | Spinner Shipbuilding & Dry-dock Co., steel..... | Third district Government fleet; wood..... | Third district Government United States; wood..... |
| 4. Type..... | Seagoing hopper dredge..... | Con'rate mixing plant..... | Con'rate mat boat..... |
| 5. Length..... | 163 feet 6 inches..... | 120 feet..... | 160 feet..... |
| 6. Beam..... | 33 feet..... | 30 feet..... | 45 feet..... |
| 7. Depth..... | 17 feet..... | 6 feet..... | 10 feet..... |
| 8. Contract cost or estimated cost..... | \$201,990 (original price)..... | | |
| 9. Completed cost ready for service..... | \$240,000 (approximately)..... | | \$19,000..... |
| 10. Contract or estimated time to build..... | 10 months..... | 2 months..... | 2 months..... |
| 11. Actual time to build..... | 21 months..... | do..... | 3 months..... |
| | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> |
| | The original contract price of dredge San Pablo contemplated delivery of dredge at Baltimore, Md. The cost ready for service includes modifications in design under supplemental agreements; cost of superintendence of construction, inspection, etc.; delivery at San Francisco; the drydocking and minor repairs necessary after the sea voyage to put the dredge in condition to commence dredging. Several additions and alterations were also made to supply deficiencies and defects in the machinery and it is impossible to draw an exact line to show where construction ready for service ended and additions or improvements commenced. Therefore an approximate figure is given for the answer to question 9. | Installation made on scow barge No. 071. | Installation made on scow barge No. 1509. |

TABLE XXXI.—Floating plant constructed and placed in commission during the calendar year ending Dec. 31, 1916—Continued.

| District..... | | Washington, D. C. | | | |
|--|--|-------------------------------|---|--|--|
| Mississippi River, third. | | Athas..... | Averill..... | No. 14..... | No. 15..... |
| 1. Name, letter, or number | Scoy barges Nos. 1601 to 1605 inclusive. | Alexandria, Va. | Annapolis, Md. | On the works. | On the works. |
| 2. Where built. | American Bridge Co., steel. | Dravo Contracting Co., steel. | Chance Marine Construction Co., wood. | By hired labor; wood. | By hired labor; wood. |
| 3. Builder and material of hull. | | | | | |
| 4. Type | Scoy barge | Derrick boat | Gasoline launch. | Rowboat | Rowboat. |
| 5. Length | 120 feet each. | 72 feet. | 36 feet. | 15 foot 11 inches. | 15 feet. |
| 6. Beam | 30 feet each. | 34 feet. | 10 feet. | 4 foot 5 inches. | 5 feet 2 inches. |
| 7. Depth | 7 feet each. | 5 feet. | 4 feet. | 1 foot 9 inches. | 1 foot 8 inches. |
| 8. Contract cost or estimated cost. | \$7,500 each. | \$25,038. | \$3,831. | | |
| 9. Completed cost ready for service. | do. | \$28,604. | \$4,080. | | |
| 10. Contract or estimated time to build. | 6 months. | 90 days. | 80 days. | | |
| 11. Actual time to build. | do. | 144 days. | 135 days. | 10 days. | 10 days. |
| | Remarks. | | Remarks. | Remarks. | Remarks. |
| | Six steel barges under sub-project approved May 1, 1916 (E. D. 16927/263). | | Launch was completed. Trial runs and tests were in progress on Dec. 31, 1916. | Built at Washington during January, 1916. By hired labor; cost \$40.32 and is attached to dredge Dalecarlia. | Built at Washington, D. C. during March, 1916. By hired labor; cost \$41.36 and is attached to derrick boat Atlas. |

| Washington, D. C. | | | | | | | | | | |
|--|---|---|--|--|--|--|--|--|--|--|
| District..... | No. 16..... | No. 17..... | No. 18..... | No. 48..... | No. 49..... | | | | | |
| 1. Name, letter, or number. | On the works. | On the works. | On the works. | On the works. | On the works. | | | | | |
| 2. Where built. | By hired labor; wood. | By hired labor; wood. | By hired labor; wood. | By hired labor; wood. | By hired labor; wood. | | | | | |
| 3. Builder and material of hull. | Rowboat. | Rowboat. | Rowboat. | Pipe-line dredge pontoon. | Pipe-line dredge pontoon. | | | | | |
| 4. Type. | 15 feet. | 15 feet. | 15 feet. | 12 feet 8 inches. | 10 feet 8 inches. | | | | | |
| 5. Length. | 5 feet 4 inches. | 4 feet 8 inches. | 4 feet 9 inches. | 6 feet. | 7 feet. | | | | | |
| 6. Beam. | 1 foot 6 inches. | 1 foot 6 inches. | 1 foot 2 inches. | 1 foot 10 inches. | 2 feet. | | | | | |
| 7. Depth. | | | | | | | | | | |
| 8. Contract cost or estimated cost. | | | | | | | | | | |
| 9. Complete cost ready for service. | | | | | | | | | | |
| 10. Contract or estimated time to build. | 10 days. | 10 days. | 10 days. | 10 days. | 10 days. | | | | | |
| 11. Actual time to build. | | | | | | | | | | |
| | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | | | | | |
| | Built at Washington, D. C., during April, 1916, by hired labor; cost \$37.28 and is attached to derrick boat Atlas. | Built at Washington, D. C., during August, 1916, by hired labor; cost \$39.11 and is attached to the work of building Key Bridge. | Built at Washington, D. C., during September, 1916, by hired labor; cost \$39.11 and is attached to the work of building Key Bridge. | Built at Washington, D. C., during November, 1916, by hired labor; cost \$49 and is attached to dredge Dalecarlia. | Built at Washington, D. C., during November, 1916, by hired labor; cost \$56 and is attached to dredge Dalecarlia. | | | | | |

| Wheeling, W. Va. | | | | | | | | | | |
|--|-------------------------|-------------------------|-------------------------|-----------------------|-----------------------|--|--|--|--|--|
| District..... | No. 1..... | No. 2..... | No. 3..... | No. 37..... | No. 38..... | | | | | |
| 1. Name, letter, or number. | On the works. | On the works. | On the works. | On the works. | On the works. | | | | | |
| 2. Where built. | By hired labor; wood. | By hired labor; wood. | By hired labor; wood. | By hired labor; wood. | By hired labor; wood. | | | | | |
| 3. Builder and material of hull. | Dam No. 13, Ohio River. | Dam No. 13, Ohio River. | Dam No. 13, Ohio River. | Pittsburgh, Pa. | Pittsburgh, Pa. | | | | | |
| 4. Type. | Flatboat. | Flatboat. | Flatboat. | Maneuver boat. | Maneuver boat. | | | | | |
| 5. Length. | 40 feet. | 40 feet. | 40 feet. | 10 feet. | 10 feet. | | | | | |
| 6. Beam. | 12 feet. | 12 feet. | 12 feet. | 22 feet. | 22 feet. | | | | | |
| 7. Depth. | 3 feet 2 inches. | 3 feet 2 inches. | 3 feet 2 inches. | 3 feet 8 inches. | 3 feet 8 inches. | | | | | |
| 8. Contract cost or estimated cost. | \$300. | \$300. | \$300. | \$300. | \$8,000. | | | | | |
| 9. Completed cost ready for service. | \$301.13. | \$301.13. | \$357.87. | \$8,533.11. | \$8,533.11. | | | | | |
| 10. Contract or estimated time to build. | 30 days. | 30 days. | 30 days. | 11 months. | 11 months. | | | | | |
| 11. Actual time to build. | | | | | | | | | | |
| | | | | | | | | | | |

TABLE XXXI.—*Floating plant constructed and placed in commission during the calendar year ending Dec. 31, 1916—Continued.*

| District..... | | Wheeling, W. Va. | |
|--|--|--|--|
| 1. Name, letter, or number..... | No. 39, U. S. E. D., Wheeling.
Pittsburgh, Pa..... | No. 40, U. S. E. D., Wheeling.
Pittsburgh, Pa..... | No. 43, U. S. E. D., Wheeling.
Dams Nos. 21 and 22, Ohio River. |
| 2. Where built..... | Union Foundry & Machine Co.
Pittsburgh, Pa..... | Union Foundry & Machine Co.
Pittsburgh, Pa..... | United States; wood.
Decked flat. |
| 3. Builder..... | Maneuver boat..... | Maneuver boat..... | United States; wood.
Decked flat. |
| 4. Type..... | 60 feet..... | 60 feet..... | 90 feet..... |
| 5. Length..... | 22 feet..... | 22 feet..... | 20 feet..... |
| 6. Beam..... | 3 feet 8 inches..... | 3 feet 8 inches..... | 5 feet..... |
| 7. Depth..... | \$5,600..... | \$5,600..... | \$1,500..... |
| 8. Contract cost or estimated cost..... | \$3,583.11..... | \$3,583.11..... | \$2,843.04..... |
| 9. Completed cost ready for service..... | 11 months..... | 11 months..... | 6 months..... |
| 10. Contract or estimated time to build..... | | | 8 months..... |
| 11. Actual time to build..... | | | Do. |
| | | <i>Remarks.</i> | |
| | | This boat was put in commission before being completed. The cabin is yet to build, which will increase the cost about \$500. | |
| District..... | | Wheeling, W. Va. | |
| 1. Name, letter, or number..... | No. 65, U. S. E. D., Wheeling.
Dams Nos. 21 and 22, Ohio River. | No. 66, U. S. E. D., Wheeling.
Dams Nos. 21 and 22, Ohio River. | No. 67, U. S. E. D., Wheeling.
Dams Nos. 21 and 22, Ohio River. |
| 2. Where built..... | United States; wood. | United States; wood. | United States; wood. |
| 3. Builder and material of hull..... | Decked flat. | Decked flat. | Decked flat. |
| 4. Type..... | 90 feet..... | 100 feet..... | 100 feet..... |
| 5. Length..... | 20 feet..... | 22 feet..... | 22 feet..... |
| 6. Beam..... | 5 feet..... | 5 feet..... | 5 feet..... |
| 7. Depth..... | \$1,500..... | \$1,500 (estimated). | \$1,500 (estimated). |
| 8. Contract cost or estimated cost..... | \$2,843.04..... | \$2,900.90..... | \$2,900.90..... |
| 9. Completed cost ready for service..... | 30 days..... | 80 days..... | 80 days..... |
| 10. Contract or estimated time to build..... | do. | do. | Do. |
| 11. Actual time to build..... | | | |

TABLE XXXII.

FLOATING PLANT DROPPED OR LOST.

4839

TABLE XXXII.—Engineer department floating plant dropped or lost during calendar year ending Dec. 31, 1916.

| District..... | Charleston, S. C. | Chattanooga, Tenn. | | | |
|---|---|--------------------|-----------------|--|----------------|
| 1. Name, number, or letter of vessel..... | A..... | Nos. 1-12..... | Nos. 18-19..... | No. 21..... | No. 24..... |
| 2. Type and material of hull..... | Quarterboat..... | Drillrafts..... | Drillrafts..... | Drillrafts ¹ | Barge..... |
| 3. Condemned..... | No; dropped by affidavit ¹ | Yes..... | Yes..... | Yes..... | Yes..... |
| 4. Lost or destroyed..... | Lost ² | No..... | No..... | No..... | No..... |
| 5. Estimated value..... | \$20..... | Worthless..... | Worthless..... | Worthless..... | Worthless..... |
| 6. Casualties: | | | | | |
| (a) Nature..... | Broke adrift during hurricane July 14, 1916..... | | | | |
| (b) Date..... | July 14, 1916..... | | | | |
| (c) Place..... | Georgetown, S. C..... | | | | |
| 7. Number of crew aboard..... | None..... | | | | |
| 8. Number of lives lost..... | do..... | | | | |
| | Remarks..... | | | Remarks..... | |
| | ¹ Affidavit, E. D. 79087/132 and 133.
² Broke adrift from Moses Wharf at Georgetown, S. C., during hurricane of July 14, 1916, and can not be found. | | | ¹ Material of all pieces, wood. | |

| District..... | Chattanooga, Tenn. | | | |
|---|--------------------|----------------|--|----------------|
| 1. Name, number, or letter of vessel..... | No. 25..... | No. 39..... | No. 48..... | No. 50..... |
| 2. Type and material of hull..... | Barge..... | Barge..... | Barge ¹ | Barge..... |
| 3. Condemned..... | Yes..... | Yes..... | Yes..... | Yes..... |
| 4. Lost or destroyed..... | No..... | No..... | No..... | No..... |
| 5. Estimated value..... | Worthless..... | Worthless..... | Worthless..... | Worthless..... |
| 6. Casualties: | | | | |
| (a) Nature..... | | | | |
| (b) Date..... | | | | |
| (c) Place..... | | | | |
| 7. Number of crew aboard..... | | | | |
| 8. Number of lives lost..... | | | | |
| | | | Remarks..... | |
| | | | ¹ Material of all pieces, wood. | |

| District..... | Chattanooga, Tenn. | | Cincinnati, Ohio, first. | Cincinnati, Ohio, second. |
|---------------------------------------|--------------------|--|--|---|
| 1. Name, number, or letter of vessel. | No. 51..... | No. 4..... | No. 1, 2, and 3..... | Maneuver boat No. 3..... |
| 2. Type and material of hull. | Barge..... | Dump scow ¹ | Dump scow, wood..... | Wood..... |
| 3. Condemned..... | Yes..... | Yes..... | No..... | Mar. 31, 1916, dropped on certificate. |
| 4. Lost or destroyed..... | No..... | No..... | Destroyed under authority F. D. 7000796. | Worthless..... |
| 5. Estimated value..... | | Worthless..... | Worthless..... | None..... |
| 6. Casualties: | | | | |
| (a) Nature..... | | | | |
| (b) Date..... | | | | |
| (c) Place..... | | | | |
| 7. Number of crew aboard..... | | | | |
| 8. Number of lives lost..... | | | | |
| | | <i>Remarks.</i>
1 Material of all pieces, wood. | | <i>Remarks.</i>
Dropped on certificate, authority E. D. 7000121. |

| District..... | Cincinnati, Ohio, second. | | Dallas, Tex. | Grand Rapids, Mich. |
|---------------------------------------|--|---|-------------------------------|---|
| 1. Name, number, or letter of vessel. | No. 34..... | No. 40..... | Sulphur..... | Hancock No. 1..... |
| 2. Type and material of hull. | Push, 10-T., wood..... | Push, 10-T., wood..... | Gasoline launch, wood..... | Wood..... |
| 3. Condemned..... | Mar. 31, 1916, dropped on certificate. | Mar. 31, 1916, dropped on certificate. | | Yes, to be sold..... |
| 4. Lost or destroyed..... | None..... | Lost Dec. 13, 1915..... | Sunk June 29, 1916..... | |
| 5. Estimated value..... | | \$80..... | \$200..... | \$10..... |
| 6. Casualties: | | | | |
| (a) Nature..... | do..... | None..... | Sunk June 29, 1916..... | |
| (b) Date..... | | | On Red River near Index, Ark. | |
| (c) Place..... | | | | |
| 7. Number of crews aboard..... | | | | |
| 8. Number of lives lost..... | | | | |
| | <i>Remarks.</i>
Dropped on certificate dated Feb. 25, 1916. | <i>Remarks.</i>
Lost during high water, Dec. 14, 1915. Dropped on certificate dated Feb. 25, 1916. | | General Ludlow.
Steel.
Yes, and sold.
Unserviceable. |

TABLE XXXII.—Engineer department floating plant dropped or lost during calendar year ending Dec. 31, 1916.

| District..... | Charleston, S. C. | | Chattanooga, Tenn. | | | |
|---|--|------------------|--------------------------------|--|--|--|
| | No. 1-12..... | No. 18-19..... | No. 21..... | No. 24..... | | |
| 1. Name, number, or letter of vessel..... | A..... | Drill rafts..... | Drill rafts ¹ | Barge..... | | |
| 2. Type and material of hull..... | Quartermaster..... | Drill rafts..... | Drill rafts ¹ | Yes..... | | |
| 3. Conditioned..... | No; dropped by affidavit ¹ | Yes..... | Yes..... | No..... | | |
| 4. Lost or destroyed..... | Lost..... | No..... | No..... | Yes..... | | |
| 5. Estimated value..... | \$20..... | Worthless..... | Worthless..... | No..... | | |
| 6. Casualties:
(a) Nature..... | Broke adrift during hurricane July 14, 1916..... | Worthless..... | Worthless..... | Worthless..... | | |
| (b) Date..... | July 14, 1916..... | | | | | |
| (c) Place..... | Georgetown, S. C..... | | | | | |
| 7. Number of crew aboard..... | None..... | | | | | |
| 8. Number of lives lost..... | None..... | | | | | |
| | Remarks..... | | | Remarks..... | | |
| | ¹ Affidavit, E. D. 79087/132 and 133.
* Broke adrift from Moses Wharf at Georgetown, S. C., during hurricane of July 14, 1916, and can not be found. | | | ¹ Material of all pieces, wood. | | |

| District..... | Chattanooga, Tenn. | | | |
|---|--------------------|----------------|--|----------------|
| | No. 25..... | No. 39..... | No. 48..... | No. 50..... |
| 1. Name, number, or letter of vessel..... | Barge..... | Barge..... | Barge ¹ | Barge..... |
| 2. Type and material of hull..... | Barge..... | Barge..... | Barge ¹ | Barge..... |
| 3. Conditioned..... | Yes..... | Yes..... | Yes..... | Yes..... |
| 4. Lost or destroyed..... | No..... | No..... | No..... | No..... |
| 5. Estimated value..... | Worthless..... | Worthless..... | Worthless..... | Worthless..... |
| 6. Casualties:
(a) Nature..... | | | | |
| (b) Date..... | | | | |
| (c) Place..... | | | | |
| 7. Number of crew aboard..... | | | | |
| 8. Number of lives lost..... | | | | |
| | | | Remarks..... | |
| | | | ¹ Material of all pieces, wood. | |

| District..... | Chattanooga, Tenn. | | Cincinnati, Ohio, first. | Cincinnati, Ohio, second. | |
|--|--------------------|------------------------------|--|--|---|
| 1. Name, number, or letter of vessel..... | No. 51..... | No. 4..... | No. 1, 2, and 3..... | Maneuver boat No. 3..... | No. 16 and 17. |
| 2. Type and material of hull..... | Barge..... | Dump scow ¹ | Dump scow, wood..... | Wood..... | Center-dumping scow; wood. |
| 3. Condemned..... | Yes..... | Yes..... | No..... | Mar. 31, 1916, dropped on certificate. | Oct. 10, 1916. |
| 4. Lost or destroyed..... | No..... | No..... | Destroyed under authority P. D. 7080/98. | Worthless..... | Destroyed. |
| 5. Estimated value..... | | Worthless..... | Worthless..... | Worthless..... | Worthless. |
| 6. Casualties:
(a) Nature.....
(b) Date.....
(c) Place..... | | | | None..... | None. |
| 7. Number of crew aboard..... | | | | Do..... | Do. |
| 8. Number of lives lost..... | | | | Do..... | Do. |
| | | | | | <i>Remarks.</i>
Dropped on certificate, authority E. D. 7000/21. |

| District..... | Cincinnati, Ohio, second. | | Dallas, Tex. | Grand Rapids, Mich. | |
|--|--|---|--|----------------------|-----------------|
| 1. Name, number, or letter of vessel..... | No. 34..... | No. 40..... | Sulphur..... | Hancock No. 1..... | General Ludlow. |
| 2. Type and material of hull..... | Push, 10-T, wood..... | Push, 10-T, wood..... | Gasoline launch, wood..... | Wood..... | Steel. |
| 3. Condemned..... | Mar. 31, 1916, dropped on certificate. | Mar. 31, 1916, dropped on certificate. | | Yes, to be sold..... | Yes, and sold. |
| 4. Lost or destroyed..... | None..... | Lost Dec. 13, 1915. | Sunk June 29, 1916. | \$10..... | Unserviceable. |
| 5. Estimated value..... | | \$80. | \$200..... | | |
| 6. Casualties:
(a) Nature.....
(b) Date.....
(c) Place..... | do..... | None..... | Sunk June 29, 1916.
On Red River near Index, Ark. | | |
| 7. Number of crews aboard..... | | | | | |
| 8. Number of lives lost..... | | | | | |
| | <i>Remarks.</i>
Dropped on certificate dated Feb. 25, 1916. | <i>Remarks.</i>
Lost during high water, Dec. 13, 1915. Dropped on certificate dated Feb. 25, 1916. | | | |

TABLE XXXII.—*Engineer department floating plant dropped or lost during calendar year ending Dec. 31, 1916—Continued.*

| Grand Rapids, Mich. | | Kansas City, Mo. | | | |
|---|-------------------------|---|--|--|---|
| District..... | | 2. | III-EP. | V-S. | 8. |
| 1. Name, number, or letter of vessel..... | C-1..... | Pile driver; wood..... | Barge; wood..... | Barge; wood..... | Pontoon; wood. |
| 2. Type and material of hull..... | Wood..... | | | | Nov. 6, 1916. |
| 3. Condemned..... | Condemned and sold..... | Lost..... | Lost..... | Destroyed..... | Destroyed. |
| 4. Lost or destroyed..... | | \$3,500..... | \$30..... | \$30..... | |
| 5. Estimated value..... | Unserviceable..... | | | | |
| 6. Casualties: | | | | | |
| (a) Nature..... | | Sunk by ice..... | Punctured by floating log..... | Fire..... | |
| (b) Date..... | | Feb. 13, 1916..... | May 20, 1916..... | May 12, 1916..... | |
| (c) Place..... | | Waverly Bend, Mo..... | Pontoon Bend, Mo..... | Williston, N. Dak..... | |
| 7. Number of crew aboard..... | | None..... | None..... | None..... | |
| 8. Number of lives lost..... | | do..... | do..... | do..... | |
| | | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> | <i>Remarks.</i> |
| | | Pile Driver No. 2—See special report of May 13, 1916; ads of pile driver crushed by ice; attempts to save the piece were frustrated by the high stage of water at the time. | Barge III-EP.—See special report of June 20, 1916; struck in rake by floating log; sunk in 12 feet of water; rotten condition of hull prevented raising, as it would not stand strain of pulling; barge later disappeared. | Barge V-S.—See special report of July 7, 1916; destroyed by fire, cause of which is unknown; supposedly the fire was started by wayfarers seeking refuge on the plant. | Pontoon No. 8.—Condemned by order of representative of I. G. O. |

| Kansas City, Mo. | | Kansas City, Mo. | | Kansas City, Mo. | |
|---------------------------------------|--|---|--|--|--|
| 1. Name, number, or letter of vessel. | 26. | 27. | 28. | 29. | 30. |
| 2. Type and material of hull. | Pontoon; wood. | Pontoon; wood. | Pontoon; wood. | Pontoon; wood. | Pontoon; wood. |
| 3. Condemned. | Nov. 6, 1916. | Nov. 6, 1916. | Nov. 6, 1916. | Nov. 6, 1916. | Nov. 6, 1916. |
| 4. Lost or destroyed. | Destroyed. | Destroyed. | Destroyed. | Destroyed. | Destroyed. |
| 5. Estimated value. | \$40. | \$40. | \$40. | \$40. | \$40. |
| 6. Casualties: | | | | | |
| (a) Nature. | Sunk by ice. | Sunk by ice. | Sunk by ice. | Sunk by ice. | Sunk by ice. |
| (b) Date. | Mar. 15, 1916. | Mar. 15, 1916. | Mar. 15, 1916. | Mar. 15, 1916. | Mar. 15, 1916. |
| c. Place. | Elk Point, S. Dak. | Elk Point, S. Dak. | Elk Point, S. Dak. | Elk Point, S. Dak. | Elk Point, S. Dak. |
| 7. Number of crew aboard. | None. | None. | None. | None. | None. |
| 8. Number of lives lost. | do. | do. | do. | do. | do. |
| Remarks. | Pontoon No. 26.—Ev-
idently destroyed by ice go-
ing out in spring; valve of
plant did not warrant plac-
ing of watchman over plant,
which was secured behind a
dike, but had disappeared
when dike was inspected in
spring. | Pontoon No. 27.—As value
of plant did not warrant
placing a watchman in
charge of it when work was
finished, it was secured be-
hind the dike, but had dis-
appeared when dike was in-
spected in spring; evidently
destroyed by the ice. | Pontoon No. 28.—Same
explanation as in case of
No. 27. | Pontoon No. 29.—Same
explanation as in case of
No. 27. | Pontoon No. 30.—Destroyed
by order of condemning
officer representing I. C. O. |

TABLE XXXII.—Engineer department floating plant dropped or lost during calendar year ending Dec. 31, 1916—Continued.

| District..... | | Kansas City, Mo. | | | |
|---------------------------------------|--|------------------|--|---------------------|--|
| 1. Name, number, or letter of vessel. | 2. Type and material of hull. | 3. Condemned. | 4. Lost or destroyed. | 5. Estimated value. | 6. Casualties: |
| | | (a) Nature. | (b) Date. | (c) Place. | (d) Number of crew aboard. |
| | | | | | 8. Number of lives lost. |
| 150..... | Barge; wood..... | Lost..... | Sunk by ice.
Feb. 8, 1916.
Waverly Bend, Mo.
None..... | Do..... | Remarks.
Barge No. 150.—See special report of Feb. 21, 1916; side of barge crushed by ice; high stack of river frustrated any attempts at saving the place. |
| 151..... | Barge; wood..... | Lost..... | Sunk by ice.
Feb. 6, 1916.
Waverly Bend, Mo.
None..... | Do..... | Remarks.
Barge 151.—See special report of May 13, 1916; sunk by the ice going out in spring; all attempts to save the place were frustrated on account of the high water. |
| 225..... | Barge; wood..... | Destroyed..... | Fire.
May 13, 1916.
Williston, N. Dak.
None..... | Do..... | Remarks.
Barge 225.—See special report of July 7, 1916; destroyed by a fire, cause of which is unknown; supposedly started by waylars seeking refuge on the place. |
| 301..... | Barge, with cabins; survey boat; wood..... | Destroyed..... | Fire.
May 13, 1916.
Williston, N. Dak.
None..... | Do..... | Remarks.
No. 301, barge (with cabins); survey boats.—See special report of July 7, 1916; fire caused by waylars seeking refuge from the weather in the cabins of the plant, supposedly. |
| 301..... | Barge; wood..... | Lost..... | Sunk by ice.
Feb. 22, 1916.
Waverly Bend, Mo.
None..... | Do..... | Remarks.
Barge 301.—See special report of May 13, 1916; sunk by ice going out in spring; all attempts to save the plant were frustrated by the high water. |

| District..... | Little Rock, Ark. | Los Angeles, Cal. | Louisville, Ky. | Mississippi River, first and second districts, Memphis, Tenn. |
|--|-------------------|--------------------------|-------------------------------|---|
| 1. Name, number, or lot of vessel..... | Barge 8-07..... | No. 2 (stone barge)..... | No. 4..... | No. 6..... |
| 2. Type and material of hull..... | Wood..... | Wood..... | 20-ton fuel boat..... | Pile driver; wood. |
| 3. Condemned..... | May 30, 1916..... | March 1916..... | Dec. 8, 1916..... | (1).
Sunk, Jan. 15, 1916. |
| 4. Lost or destroyed..... | None..... | Worthless..... | Worthless..... | \$2,128.30. |
| 5. Estimated value..... | ..... | ..... | ..... | ..... |
| 6. Casualties:
(a) Nature.....
(b) Date.....
(c) Place..... | | | | |
| 7. Number of crew aboard..... | | | | None.
Do. |
| 8. Number of lives lost..... | ..... | ..... | ..... | ..... |
| | | | Remarks.
(E. D. 70194/11.) | Remarks.
Dropped on affidavit
Apr. 21, 1916. |

| District..... | Mississippi River, first and second districts, Memphis, Tenn. | Los Angeles, Cal. | Louisville, Ky. | Mississippi River, first and second districts, Memphis, Tenn. |
|--|---|---|---|---|
| 1. Name, number, or lot of vessel..... | No. 9..... | Nos. 9305, 9322, 9324, 9325, 9326, 9327..... | No. 9317..... | No. 9407..... |
| 2. Type and material of hull..... | Pile driver; wood..... | Material barge; wood..... | Fuel barge..... | Model barge. |
| 3. Condemned..... | (1).
Sunk May 30, 1916.
\$2,063.43. | Sunk May 30, 1916.
No value. | Sunk.
No value. | Sunk.
No value. |
| 4. Lost or destroyed..... | Lost; dropped on affidavit.
\$15. | | | |
| 5. Estimated value..... | ..... | ..... | ..... | ..... |
| 6. Casualties:
(a) Nature.....
(b) Date.....
(c) Place..... | | | | |
| 7. Number of crew aboard..... | None..... | None..... | None..... | None.
Do. |
| 8. Number of lives lost..... | ..... | ..... | ..... | ..... |
| | Remarks.
Dropped on affidavit,
Apr. 21, 1916.
Dropped on affidavit,
June, 1916. | Remarks.
Dropped by inventory
and inspection, June, 1916. | Remarks.
Dropped by inventory
and inspection, Oct., 1916. | Remarks.
Dropped by inventory
and inspection, Oct., 1916. |

TABLE XXXII.—*Engineer Department floating plant dropped or lost during calendar year ending Dec. 31, 1916—Continued.*

| District..... | Mississippi River, first and second districts, Memphis, Tenn. | | | Mobile, Ala. | Montgomery, Ala. |
|---|--|---|--|---------------------------------|----------------------|
| 1. Name, number, or letter of vessel..... | No. 9313..... | F..... | I..... | No. 25..... | Nos. 23, 24, and 25. |
| 2. Type and material of hull..... | Hydraulic grader; crosscut wood hull..... | 42-ton barge; wood..... | 20-ton barge; wooden hull..... | 137-ton barge; wooden hull..... | Wooden pontoons. |
| 3. Condemned..... | Dropped on affidavit, Nov. 3, 1916..... | Lost..... | No..... | No..... | Lost. |
| 4. Lost or destroyed..... | Sunk Dec. 21, 1915..... | Worthless..... | Destroyed Feb. 17, 1916..... | Destroyed Mar. 20, 1916..... | Worthless. |
| 5. Estimated value..... | \$7,420.25..... | None..... | Worthless..... | Worthless..... | |
| 6. Casualties: | | | | | |
| (a) Nature..... | None..... | Lost in hurricane..... | None..... | None..... | |
| (b) Date..... | None..... | July 5, 1916..... | do..... | do..... | |
| (c) Place..... | None..... | Mobile, Ala..... | do..... | do..... | |
| 7. Number of crew aboard..... | 5..... | do..... | do..... | do..... | |
| 8. Number of lives lost..... | None..... | do..... | do..... | do..... | |
| | <i>Remarks.</i>
At the time this grader sunk it was thought that it could be raised. In Oct., 1916, the water had receded sufficiently and the raising was found to be impractical and the machinery was removed. | <i>Remarks.</i>
Destroyed under authority dated Mar. 16, 1916 (E. D. 79119/225). | <i>Remarks.</i>
Destroyed under authority dated Mar. 8, 1916 (E. D. 79119/214). | | |

| District..... | Montgomery, Ala. | Nashville, Tenn. | No. 3..... | No. 4..... | No. 11..... | No. 12..... |
|--|---|--------------------------|---|---|---|---|
| 1. Name, number, or letter of vessel..... | Barge No. 35..... | ..... | ..... | ..... | ..... | ..... |
| 2. Type and material of hull..... | 60-ton barge, wood..... | ..... | Scow, wood..... | Scow, wood..... | Barge, wood..... | Barge, wood..... |
| 3. Condemned..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 4. Lost or destroyed..... | Sunk at Mayes Bar, Ga., Jan. 1, 1915..... | ..... | Destroyed..... | Destroyed..... | Destroyed..... | Destroyed..... |
| 5. Estimated value..... | Worthless..... | ..... | Worthless..... | Worthless..... | Worthless..... | Worthless..... |
| 6. (Qualifies: (a) Nature..... (b) Date..... (c) Place.....) | ..... | ..... | ..... | ..... | ..... | ..... |
| 7. Number of crew aboard..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 8. Number of lives lost..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | <i>Remarks.</i>
This barge was sunk above dam at Mayes Bar, Ga., on Jan. 1, 1915, owing to water leaking through seams. Efforts were made to raise barge during low-water season but were abandoned on Oct. 7, 1915, on account of excessive cost. | <i>Remarks.</i>
..... | <i>Remarks.</i>
Destroyed under authority of E. D. 79122/82, July 3, 1916. | <i>Remarks.</i>
Destroyed under authority of E. D. 79122/82, July 3, 1916. | <i>Remarks.</i>
Broken up under authority of E. D. 79122/82, July 3, 1916. | <i>Remarks.</i>
Destroyed under authority of E. D. 79122/82, July 3, 1916. |

TABLE XXXII.—*Engineer Department floating plant dropped or lost during calendar year ending Dec. 31, 1916—Continued.*

| District..... | New Orleans, La. | Fourth Mississippi River. | | | First New York. |
|--|---------------------|---------------------------|-------------------------------------|--|-----------------|
| 1. Name, number, or letter of vessel..... | No. 25..... | No. 28-C..... | No. 50..... | Capt. Andrew Talcott. | |
| 2. Type and material of hull..... | Barge, wood..... | Untreated wood..... | Cresosoted wood..... | Hydraulic pipe-line dredge, wood. | |
| 3. Condemned..... | Apr 28, 1916..... | Yes..... | 1 set in hurricane of July 6, 1916. | | |
| 4. Lost or destroyed..... | Sold for \$160..... | Yes..... | \$5,000..... | | |
| 5. Estimated value..... | \$160..... | \$50..... | | \$90,150. | |
| 6. Casualties:
(a) Nature.....
(b) Date.....
(c) Place..... | | | | | |
| 7. Number of crew aboard..... | | | | | |
| 8. Number of lives lost..... | | | | <i>Remarks.</i>
Exchanged Feb. —, 1916, for dredge Gillespie; value allowed for dredge Talcott in the exchange, \$90,150. | |

| District..... | First New York. | | | | |
|--|--|---|--|---|---|
| 1. Name, number, or letter of vessel..... | No. 8, Hudson River..... | No. 18, Hudson River..... | No. 21, Hudson River..... | No. 35, Hudson River..... | No. 36, Hudson River. |
| 2. Type and material of hull..... | Quarter boat..... | Derrick boat..... | Gravel digging and screening; plant, wood. | 250-ton barge..... | 150-ton barge. |
| 3. Condemned..... | | | | | |
| 4. Lost or destroyed..... | | | | | |
| 5. Estimated value..... | \$1,200..... | \$2,550..... | \$3,500..... | \$751..... | \$5. |
| 6. Casualties:
(a) Nature.....
(b) Date.....
(c) Place..... | | | | | |
| 7. Number of crew aboard..... | | | | | |
| 8. Number of lives lost..... | | | | | |
| | <i>Remarks.</i>
Sold Sept. 15, 1916, to Allen Engineering & Contracting Co., for \$1,200. | <i>Remarks.</i>
Sold Sept. 24, 1916, to The Foundation Co., for \$2,550. | <i>Remarks.</i>
Sold July 22, 1916, to Great Lakes Dredge & Dock Co. for \$3,500. | <i>Remarks.</i>
Sold Nov. 21, 1916, to Edward A. Mealey for \$751. | <i>Remarks.</i>
Sold Aug. 29, 1916, to Forman & Riggs for \$5. |

| District..... | First New York. | Second New York. | Pittsburgh, Pa. | First Portland, Oreg. | Rock Island, Ill. |
|---|---|---|-------------------------------------|---------------------------------|--------------------|
| 1. Name, number, or letter of vessel..... | No. 43, Hudson River. | Engineer, N. Y. | Quarter boat (nonpropelling) No. 2. | Wallows..... | Motor skiff Dolly. |
| 2. Type and material of hull..... | 250-ton barge..... | Tug, steam, screw, steel. | Wood..... | Self-propelled steamboat, wood. | Wood. |
| 3. Condemned..... | | Sold to Panama Canal Commission Mar., 1916. | June 27, 1916. | Sept. 10, 1916. | Mar. 28, 1916. |
| 4. Lost or destroyed..... | | \$40,000. | \$40. | | |
| 5. Estimated value..... | \$450. | | | | |
| 6. Casualties: | | | | | |
| (a) Nature..... | | | | | |
| (b) Date..... | | | | | |
| (c) Place..... | | | | | |
| 7. Number of crew aboard..... | | | | | |
| 8. Number of lives lost..... | | | | | |
| | Remarks. | | | | Remarks. |
| | Sold July 28, 1916, to H. R. Dece, for \$450. | | | | Worn out. |

| District..... | Rock Island, Ill. | | | |
|---|-------------------|---|--------------------|----------------------|
| 1. Name, number, or letter of vessel..... | Motor skiff Fox. | Motor skiff Fuschia. | Motor skiff Polly. | Motor skiff Sally. |
| 2. Type and material of hull..... | Wood. | Wood. | Wood. | Wood. |
| 3. Condemned..... | Mar. 28, 1916. | Mar. 28, 1916. | Mar. 28, 1916. | Mar. 28, 1916. |
| 4. Lost or destroyed..... | | Lost 8 p. m. 23, 1915. | | |
| 5. Estimated value..... | | \$220. | | |
| 6. Casualties: | | | | |
| (a) Nature..... | | | | |
| (b) Date..... | | | | |
| (c) Place..... | | | | |
| 7. Number of crew aboard..... | | | | |
| 8. Number of lives lost..... | | | | |
| | Remarks. | Remarks. | Remarks. | Remarks. |
| | Worn out. | This motor skiff was sunk and lost in a deep hole on Rock Island Rapids. Broke loose from steamer Mississippi while being towed up stream Sept. 23, 1915. | Worn out. | Worn out. |
| | | | | Motor skiff Sparrow. |
| | | | | Wood. |
| | | | | Mar. 28, 1916. |

TABLE XXXII.—Engineer Department floating plant dropped or lost during calendar year ending Dec. 31, 1916—Continued.

| District..... | | Rock Island, Ill. | | | | St. Louis, Mo. |
|---------------------------------------|---|----------------------------|------------------------------------|---------------------------|----------------------|-----------------------------------|
| 1. Name, number, or letter of vessel. | Motor skiff Swift..... | Magazine boat No. 106..... | Barge's L, 170, 206, 221, 222..... | Quarter boat No. 232..... | 114, 116, 121, 125. | |
| 2. Type and material of hull. | Wood..... | Wood..... | Wood..... | Wood..... | Barges, model, wood. | |
| 3. Condition..... | Mar. 28, 1916..... | Mar. 28, 1916..... | Mar. 28, 1916..... | Mar. 28, 1916..... | Apr., 1916. | |
| 4. Lost or destroyed..... | | | | | \$100 each. | |
| 5. Estimated value..... | | | | | | |
| 6. Cause of loss: | | | | | | |
| (a) Nature..... | | | | | | |
| (b) Date..... | | | | | | |
| (c) Place..... | | | | | | |
| 7. Number of crew aboard..... | | | | | | |
| 8. Number of lives lost..... | | | | | | |
| Remarks..... | Worn out. | Remarks.
Worn out. | Remarks.
Worn out. | Remarks.
Worn out. | Condemned and sold. | |
| District..... | | St. Paul, Minn. | Vicksburg, Miss. | | | |
| 1. Name, number, or letter of vessel. | No. 1..... | No. 2..... | No. 932..... | No. 9081..... | No. 3 and 4. | |
| 2. Type and material of hull. | Yawl; wood..... | Quarter boat; wood..... | Scow barge; wood..... | Scow barge; wood..... | Flatboat; wood. | |
| 3. Condition..... | Under authority E. D. 7914/10. | | June 1, 1916. | June 1, 1916. | E. D. 7920/71. | |
| 4. Lost or destroyed..... | Destroyed, authority E. D. 7914/41. | Sold in September, 1916. | | | Nominal. | |
| 5. Estimated value..... | | \$50..... | | | | |
| 6. Cause of loss: | | | | | | |
| (a) Nature..... | | | | | | |
| (b) Date..... | | | | | | |
| (c) Place..... | | | | | | |
| 7. Number of crew aboard..... | | | | | | |
| 8. Number of lives lost..... | | | | | | |
| Remarks..... | This yawl was inadvertently included in the floating plant report for fiscal year ending June 30, 1916. | | | | | |
| | | | | | | Third Mississippi River district. |

| Third Mississippi River district. | | | Washington, D. C. | |
|---|---------------------------------|--|--|-----------------------------------|
| District..... | | | | |
| 1. Name, number, or letter of vessel..... | Nos. 86, 87, and 188..... | Nos. 567, 571, 574, and 577..... | Rowboat No. 1..... | Rowboat No. 7..... |
| 2. Type and material of hull..... | Quarter boats: wood, all 3..... | Snow barges: wood..... | Wood..... | Wood..... |
| 3. Condemned..... | Authority, E. D. 79250/71..... | E. D. 79250/71..... | Condemned November, 1916..... | Condemned August, 1916..... |
| 4. Lost or destroyed..... | Nominal..... | Nominal..... | Worthless..... | Worthless..... |
| 5. Estimated value..... | | | | |
| 6. Casualties: | | | | |
| (a) Nature..... | | | | |
| (b) Date..... | | | | |
| (c) Place..... | | | | |
| 7. Number of crew aboard..... | | | | |
| 8. Number of lives lost..... | | | | |
| | | | | |
| Washington, D. C. | | | Wheeling, W. Va. | |
| District..... | | | | |
| 1. Name, number, or letter of vessel..... | Rowboat No. 2..... | Sergeant Burke..... | L. C. Wolfe..... | No. 4, U. S. E. D. Wheeling. |
| 2. Type and material of hull..... | Wood..... | Gasoline launch, screw, wood..... | Derrick boat: wood..... | 150-ton, half-decked, flat; wood. |
| 3. Condemned..... | August, 1916..... | Apr. 8, 1916..... | Sept. 19, 1916..... | May 20, 1916..... |
| 4. Lost or destroyed..... | Worthless..... | Saw below ¹ | | |
| 5. Estimated value..... | | \$50..... | | |
| 6. Casualties: | | | | |
| (a) Nature..... | | | | |
| (b) Date..... | | | | |
| (c) Place..... | | | | |
| 7. Number of crew aboard..... | | | | |
| 8. Number of lives lost..... | | | | |
| | | Remarks..... | Remarks..... | |
| | | ¹ Sold Oct. 14, 1916, for \$205.00. | Sunk Dec. 18, 1915.
Authorized to drop, Sept. 19, 1916. | |

TABLE XXXII.—Engineer Department floating plant dropped or lost during calendar year ending Dec. 31, 1916—Continued.

| District..... | Wheeling, W. Va. | | Wilmington, N. C. |
|--|---|--|--|
| | No. 5, U. S. E. D., Wheeling
Flat; wood hull..... | L. K. No. 1.....
Flatboat; wood.....
Apr. 5, 1916.....
Nothing..... | Scow 10, scow B, scow B-12.
Deck scow, wood; deck scow, wood;
deck scow, wood..... |
| 1. Name, number, or letter of vessel..... | | | |
| 2. Type and material of hull..... | | | |
| 3. Condemned..... | | | |
| 4. Lost or destroyed..... | Sunk Nov. 11, 1915; broken in two
Sept. 6, 1916. | | |
| 5. Estimated value..... | \$150..... | | |
| 6. Casualties:
(a) Nature.....
(b) Date.....
(c) Place..... | | | |
| 7. Number of crew aboard..... | No crew..... | | |
| 8. Number of lives lost..... | None..... | | |
| | Remarks.

This flat was sunk while being towed on the night of Nov. 11, 1915. Owing to the high stage of the river following that date, no attempt was made to raise the flat, until on Sept. 6, 1916, which resulted in breaking it in two, leaving it a worthless wreck. | Remarks.

Worn out in the service. | Remarks.

Condemned. |

TABLE XXXIII.

**OFFICIAL NUMBER FOR ENGINEER
DEPARTMENT VESSELS.**

4853

TABLE XXXIII.—*Official numbers for Engineer Department vessels.*

| District..... | Charleston, S. C. | | Mobila, Ala. |
|---|------------------------------|------------------------------|-------------------|
| 1. Name..... | Sumter..... | Winyah Bay..... | Charleston. |
| 2. Type..... | Sea-going hopper dredge..... | Sea-going hopper dredge..... | Sea-going dredge. |
| 3. Official number..... | G. W. M. C..... | G. W. M. D..... | G. W. M. B. |
| 4. Signal letters..... | | | 517.36. |
| 5. Gross tonnage..... | | 253.90..... | 253.90. |
| 6. Net tonnage..... | | | Charleston, S. C. |
| 7. Home port (where document issued)..... | | | |

FINDING LIST.

SHOWING THE SUBDIVISIONS OF THIS REPORT BY DISTRICTS.

[The references in roman are to part (or volume) and those in arabic to page.]

| | Page. |
|--|-------------------|
| River and Harbor Board..... | I, 45; II, 1969 |
| Portland, Me..... | I, 48; II, 1975 |
| Boston, Mass..... | I, 68; II, 1985 |
| Newport, R. I..... | I, 118; II, 2019 |
| New London, Conn..... | I, 150; II, 2037 |
| New York City, first district..... | I, 201; II, 2061 |
| New York City, second district..... | I, 289; II, 2097 |
| New York City, third district..... | I, 310; II, 2119 |
| Philadelphia, Pa..... | I, 350; II, 2145 |
| Wilmington, Del..... | I, 375; II, 2167 |
| Baltimore, Md..... | I, 433; II, 2201 |
| Washington, D. C..... | I, 481; II, 2233 |
| Norfolk, Va..... | I, 507; II, 2253 |
| Wilmington, N. C..... | I, 549; II, 2275 |
| Charleston, S. C..... | I, 616; II, 2333 |
| Savannah, Ga..... | I, 648; II, 2359 |
| Jacksonville, Fla..... | I, 698; II, 2381 |
| Montgomery, Ala..... | I, 780; II, 2427 |
| Mobile, Ala..... | I, 832; II, 2473 |
| New Orleans, La..... | I, 877; II, 2505 |
| Galveston, Tex..... | I, 949; II, 2567 |
| Dallas, Tex..... | I, 1013; II, 2597 |
| Vicksburg, Miss..... | I, 1047; II, 2623 |
| Little Rock, Ark..... | I, 1088; II, 2653 |
| St. Louis, Mo..... | I, 1115; II, 2677 |
| Rock Island, Ill..... | I, 1121; II, 2699 |
| St. Paul, Minn..... | I, 1136; II, 2733 |
| Kansas City, Mo..... | I, 1167; II, 2745 |
| Nashville, Tenn..... | I, 1197; II, 2785 |
| Chattanooga, Tenn..... | I, 1210; II, 2805 |
| Ohio River, locks and dams..... | I, 1244; II, 2833 |
| Pittsburgh, Pa..... | I, 1281; II, 2931 |
| Wheeling, W. Va..... | I, 1281; II, 2959 |
| Cincinnati, Ohio, first district..... | I, 1287; II, 2975 |
| Louisville, Ky..... | I, 1292; II, 2987 |
| Cincinnati, Ohio, second district..... | I, 1302; II, 3003 |
| Duluth, Minn..... | I, 1314; II, 3027 |
| Milwaukee, Wis..... | I, 1347; II, 3049 |
| Chicago, Ill..... | I, 1401; II, 3083 |
| Grand Rapids, Mich..... | I, 1430; II, 3107 |
| Detroit, Mich..... | I, 1476; II, 3153 |
| Cleveland, Ohio..... | I, 1522; II, 3205 |
| Buffalo, N. Y..... | I, 1557; II, 3225 |
| Los Angeles, Cal..... | I, 1597; II, 3261 |
| San Francisco, Cal., first district..... | I, 1612; II, 3267 |
| San Francisco, Cal., third district..... | I, 1642; II, 3283 |
| Portland, Oreg, first district..... | I, 1666; II, 3301 |
| Portland, Oreg., second district..... | I, 1715; II, 3329 |
| Seattle, Wash..... | I, 1747; II, 3353 |
| Honolulu, Hawaii..... | I, 1792; II, 3381 |
| San Juan, P. R..... | I, 1800; II, 3389 |
| California Débris Commission..... | I, 1805; II, 3393 |

INDEX.

[The references in roman are to part (or volume) and those in arabic to page.]

A.

| | Page. |
|--|--------------------|
| Abraham Lincoln Memorial, District of Columbia | I, 1904; III, 8724 |
| Absecon Creek, N. J., improvement | I, 399; II, 2179 |
| Absecon Inlet, N. J., improvement | I, 397; II, 2177 |
| Academy Creek, Brunswick Harbor, Ga., improvement | I, 692; II, 2577 |
| Acushnet River, New Bedford Harbor, Mass., improvement | I, 123; II, 2022 |
| Adams Creek, N. C., improvement of waterway via | I, 536; II, 2266 |
| Agate Bay Harbor, Minn., improvement | I, 1817; II, 8028 |
| Alabama River, Ala., improvement | I, 819; II, 2461 |
| Alabama, State of, removal of water hyacinths from | I, 945; II, 2568 |
| Albemarle & Chesapeake Canal, N. C. and Va., improvement | I, 536; II, 2266 |
| Albemarle Sound, N. C., improvement of waterway to Norfolk, Va., via
Pasquotank River | I, 534; II, 2265 |
| Alexandria, Va., improvement of Potomac River at | I, 488; II, 2237 |
| Algoma Harbor, Wis., improvement | I, 1369; II, 8061 |
| Allegheny River, Pa.: | |
| Construction of locks and dams | I, 1272; II, 2950 |
| Improvement by open-channel work | I, 1269; II, 2948 |
| Improvement of Pittsburgh Harbor | I, 1276; II, 2955 |
| Operating and care of locks and dams | I, 1275; II, 2952 |
| Alligator Creek, S. C., improvement of waterway from McClellanville to
Charleston | I, 638; II, 2351 |
| Alligator River, N. C., improvement of waterway via | I, 536; II, 2266 |
| Alloway Creek, N. J., improvement | I, 389; II, 2173 |
| Alpena Harbor, Mich., improvement | I, 1504; II, 3194 |
| Altamaha River, Ga., improvement | I, 682; II, 2374 |
| Ambrose Channel, New York Harbor, N. Y., improvement | I, 269; II, 2097 |
| American Red Cross, memorial to women of Civil War to be used
by | I, 1905; III, 8725 |
| Annie River, La., improvement | I, 897; II, 2533 |
| Anacostia River, D. C.: | |
| Improvement | I, 485; II, 2235 |
| Reclamation and development of the flats | I, 1861; III, 3675 |
| Anahuac Channel, Tex., improvement | I, 971; II, 2581 |
| Anchorage grounds, establishment of | I, 1829 |
| Anclote River, Fla., improvement | I, 747; II, 2411 |
| Androscoggin River, Me., examination | I, 68 |
| Apalachicola Bay, Harbor, and River, Fla.: | |
| Examination and survey of channel through St. Georges Sound to
Gulf of Mexico | I, 831 |
| Improvement of channel to St. Andrews Bay | I, 796; II, 2443 |
| Improvement of harbor in bay | I, 782; II, 2430 |
| Improvement of river, including the Cut-off, Lee Slough, and lower
Chipola River | I, 785; II, 2432 |
| Reexamination of river, including the Cut-off, Lee Slough, lower
Chipola River, and upper Chipola River | I, 831 |
| Apoon Mouth, Yukon River, Alaska, improvement | I, 1787; II, 3380 |
| Appomattox River, Va., improvement | I, 522; II, 2260 |
| Appoquinimink River, Del., improvement | I, 409; II, 2184 |

| | Page. |
|---|--------------------|
| Appropriations: | |
| Allotments and transfers under river and harbor act of March 4, 1915..... | I, 44 |
| Fortifications..... | I, 10-17 |
| Locks and dams. Ohio River..... | I, 1258 |
| Rivers and harbors..... | I, 43 |
| Aqueduct Bridge, Washington, D. C., repair..... | I, 1886 |
| Aqueduct, Washington, D. C., maintenance and repair of..... | I, 1876; III, 3681 |
| Aquila Creek, Va.: | |
| Examination and survey..... | I, 507 |
| Improvement..... | I, 493; II, 2241 |
| Aransas Bay and Pass, Tex.: | |
| Improvement at Harbor Island..... | I, 1008; II, 2594 |
| Improvement of channel to Corpus Christi (via Turtle Cove)..... | I, 989; II, 2590 |
| Improvement of channel to Pass Cavallo..... | I, 997; II, 2589 |
| Improvement of channel to Victoria (on Guadalupe River)..... | I, 993; II, 2588 |
| Improvement of Pass..... | I, 1008; II, 2594 |
| Arcadia Harbor, Mich., improvement..... | I, 1462; II, 5141 |
| Arcata Channels, Humboldt Bay, Cal., examination..... | I, 1641 |
| Arkansas River, Ark.: | |
| Examination and survey..... | I, 1115 |
| Improvement..... | I, 1088; II, 2633 |
| Arlington Memorial Amphitheater and Chapel..... | I, 1905; III, 5726 |
| Arlington Memorial Bridge Commission..... | I, 1906; III, 5727 |
| Armories, Coast Artillery, militia, equipment..... | I, 20 |
| Armory Commission of District of Columbia..... | I, 1904; III, 5725 |
| Arroyo Colorado, Tex., examination and survey..... | I, 1012 |
| Arthur Kill, N. Y. and N. J., improvement..... | I, 319; II, 2127 |
| Arthur Lake, Mermentau River, La., improvement..... | I, 932; II, 2556 |
| Arts, Fine, Commission of..... | I, 1904; III, 5725 |
| Ashland Harbor, Wis.: | |
| Improvement..... | I, 1327; II, 3065 |
| Reexamination..... | I, 1347 |
| Ashley River, S. C.: | |
| Examination and survey..... | I, 647 |
| Improvement..... | I, 645; II, 2358 |
| Ashtabula Harbor, Ohio, improvement..... | I, 1548; II, 5219 |
| Assistants: | |
| Civilian, to Engineer officers..... | I, 82 |
| On duty in the office of the Chief of Engineers..... | I, 1995 |
| Association of Congresses of Navigation, Permanent International..... | I, 1823 |
| Atchafalaya Bay Ship Channel Co., maintenance of channel from Morgan City to the Gulf of Mexico by..... | I, 918; II, 2547 |
| Atchafalaya River, La., improvement from Morgan City to the Gulf of Mexico..... | I, 918; II, 2547 |
| Augusta, Ga.: | |
| Examination and survey of Savannah River at..... | I, 607 |
| Improvement of Savannah River above..... | I, 659; II, 2365 |
| Improvement of Savannah River at..... | I, 656; II, 2365 |
| Improvement of Savannah River below..... | I, 654; II, 2364 |
| Augusta Narrows, White River, Ark., improvement..... | I, 1094; II, 2694 |
| Austwell, Tex., examination and survey to inland waterway in San Antonio Bay..... | I, 1012 |
| Aux Becs Scies Lake, Frankfort Harbor, Mich., improvement..... | I, 1464; II, 5142 |

B.

Back Bay of Biloxi, Miss.:

| | |
|--|-------------------|
| Examination and survey of channel to..... | I, 876 |
| Improvement of Biloxi Harbor..... | I, 965; II, 2500 |
| Back Cove, Portland Harbor, Me., improvement..... | I, 61; II, 1980 |
| Back Creek to York River, Va., examination and survey..... | I, 507 |
| Back (Weymouth) River, Mass., improvement..... | I, 109; II, 2013 |
| Bakers Bay, Oreg., examination and survey..... | I, 1748 |
| Ballard, Wash., improvement of Lake Washington Canal..... | I, 1768; II, 3364 |

INDEX.

| | |
|--|-----------------|
| Baltimore, Md.: | |
| Defenses of..... | |
| Engineering district..... | 1, 43 |
| Improvement of harbor and channels..... | 1, 43 |
| Bangor Harbor, Penobscot River, Me., improvement..... | 1, 5 |
| Barataria Bay, La., examination and survey..... | 1, 5 |
| Bar Harbor, Me., construction of breakwater..... | 1, 146 |
| Bar Lake, Arcadia Harbor, Mich., improvement..... | 1, 129 |
| Barren River, Ky., operating and care of lock and dam..... | 1, 190-1 |
| Barry Statue Commission..... | 1, 106 |
| Bartholomew Bayou, La. and Ark.: | |
| Improvement..... | 1, 106 |
| Reexamination..... | |
| Bass Harbor, Me., improvement..... | 1, 5 |
| Bastrop Bayou, Tex., improvement..... | 1, 98 |
| Batteries, gun and mortar..... | 1, 23 |
| Battery, The, New York Harbor, N. Y., removal of shoal in Hudson Rl off Pier A..... | 1, 27 |
| Bay Ridge Channel, New York Harbor, N. Y., improvement..... | 1, 56 |
| Bay River, N. C., improvement..... | 1, 26 |
| Bayside Channel, New York Harbor, N. Y., improvement..... | 1, 56 |
| Beach Creek, Va., examination and survey..... | 1, 107 |
| Bear Creek, Miss.: | |
| Improvement..... | 1, 107 |
| Reexamination..... | |
| Beaufort Harbor and River, N. C.: | |
| Improvement of harbor..... | 1, 57 |
| Improvement of waterway to Core Sound..... | 1, 58 |
| Improvement of waterway to Jacksonville, N. C..... | 1, 58 |
| Improvement of waterway to New River..... | 1, 58 |
| Reexamination of waterway to New River..... | |
| Beaufort Inlet, N. C.: | |
| Improvement..... | 1, 59 |
| Improvement of waterway to Norfolk, Va..... | 1, 59 |
| Improvement of waterway to Pamlico Sound..... | 1, 57 |
| Operating and care, waterway to Norfolk, Va..... | 1, 54 |
| Beaufort, S. C.: | |
| Improvement of waterway to St. Johns River, Fla..... | 1, 66 |
| Improvement of waterway to Savannah, Ga..... | 1, 66 |
| Beaumont Harbor, Tex., examination and survey..... | 1, 66 |
| Bee Tree Shoals Canal, Tennessee River, Ala., operating and care..... | 1, 177 |
| Belfast Harbor, Me., examination and survey..... | 1, 143 |
| Bellingham Bay and Harbor, Wash., improvement of Whatcom Cre waterway (New Whatcom Harbor)..... | 1, 143 |
| Benton Harbor Canal, St. Joseph Harbor, Mich., improvement..... | 1, 90 |
| Berkeley Harbor, Cal., examination and survey..... | 1, 110 |
| Beverly Harbor, Mass., improvement..... | 1, 105 |
| Big Kanawha River, W. Va., operating and care of locks and dams..... | 1, 105 |
| Big Sandy River, W. Va. and Ky.: | |
| Improvement, including Tug and Levisa Forks..... | 1, 130 |
| Operating and care of locks and dams..... | 1, 130 |
| Big Stone Lake, Minn., examination and survey..... | 1, 107 |
| Big Sunflower River, Miss., improvement..... | 1, 478 |
| Big Thoroughfare River, Md., improvement..... | 1, 478 |
| Biloxi Harbor, Miss.: | |
| Examination and survey of channel to Back Bay of Biloxi..... | |
| Improvement..... | 1, 86 |
| Biucayne Bay, Fla., improvement..... | 1, 722 |
| Blackfish Bayou, Ark., improvement..... | 1, 110 |
| Black John Slough, Cal., examination and survey..... | 1, 141 |
| Black Lake Harbor, Muscatawa Bay, Mich., examination and survey..... | 1, 141 |
| Black Lake, Holland Harbor, Mich., improvement..... | 1, 110 |
| Black River, Ark. and Mo., improvement..... | 1, 105 |
| Black River, La., improvement..... | 1, 153 |
| Black River, Lorain, Ohio, improvement..... | 1, 153 |

| | Page |
|---|-------------------|
| Black River, Mich., improvement..... | I, 1511; II, 3200 |
| Black River, N. C., improvement..... | I, 610; II, 2327 |
| Black River, Wis., operating snag and dredge boats..... | I, 1131; II, 2728 |
| Black Rock Harbor and Channel, N. Y.: | |
| Improvement..... | I, 1567; II, 3235 |
| Improvement of Lake Erie entrance..... | I, 1567; II, 3235 |
| Operating and care of canal and lock, etc..... | I, 1573; II, 3238 |
| Black Rock Harbor, Conn., improvement..... | I, 183; II, 2051 |
| Black Warrior River, Ala.: | |
| Improvement..... | I, 840; II, 2479 |
| Operating and care of locks and dams..... | I, 851; II, 2496 |
| Blackwater River, Fla., improvement..... | I, 811; II, 2455 |
| Blackwater River, Va., improvement..... | I, 542; II, 2271 |
| Block Island, R. I.: | |
| Construction of harbor of refuge..... | I, 144; II, 2034 |
| Improvement of Great Salt Pond..... | I, 146; II, 2035 |
| Blood River, La., improvement..... | I, 894; II, 2531 |
| Boards: | |
| <i>See also</i> Commissions. | |
| Engineers for Rivers and Harbors..... | I, 45; II, 1969 |
| Experimental towboats, Mississippi River..... | I, 1825; II, 3405 |
| Fortifications or other defenses (Endicott Board)..... | I, 8 |
| National coast defense..... | I, 8 |
| The Board of Engineers..... | I, 7 |
| Boca Ciega Bay, Fla.: | |
| Examination and survey of channel to Gulf of Mexico..... | I, 778 |
| Improvement..... | I, 745; II, 2410 |
| Boeuf River, La., improvement..... | I, 1061; II, 2634 |
| Bogue Falla, La., improvement..... | I, 890; II, 2528 |
| Bogues Bay, Va., improvement..... | I, 431; II, 2196 |
| Bogue Sound, N. C., improvement..... | I, 588; II, 2306 |
| Booms, permits for erection of..... | I, 1839 |
| Boston, Mass.: | |
| Defenses..... | I, 8 |
| Engineering district..... | I, 68; II, 1965 |
| Improvement of harbor..... | I, 77; II, 1968 |
| Brandywine River, Wilmington Harbor, Del., improvement..... | I, 406; II, 2182 |
| Branford Harbor, Conn., improvement..... | I, 171; II, 2046 |
| Brazos Island Harbor, Tex., examination and survey..... | I, 1012 |
| Brazos River, Tex.: | |
| Examination for flood control..... | I, 1047 |
| Improvement between Old Washington and Waco..... | I, 1033; II, 2616 |
| Improvement between Velasco and Old Washington..... | I, 1005; II, 2598 |
| Improvement of channel to Matagorda Bay..... | I, 991; II, 2587 |
| Improvement of mouth..... | I, 1002; II, 2592 |
| Operating and care of Lock and Dam No. 1..... | I, 1035; II, 2617 |
| Reexamination from Old Washington to Waco..... | I, 1012 |
| Brenton's Cove, R. I., removal of Nourmahal Rock..... | I, 131; II, 2027 |
| Bridgeport Harbor, Conn., improvement..... | I, 183; II, 2051 |
| Bridges: | |
| Alteration of, obstructing navigation..... | I, 1838 |
| Aqueduct Bridge, Washington, D. C..... | I, 1896 |
| Construction across navigable waters..... | I, 1830 |
| Highway Bridge, Washington, D. C..... | I, 1884; II, 3722 |
| Key Bridge, Potomac River at Georgetown, D. C., construction..... | I, 1872 |
| Rules governing opening of draws..... | I, 1829 |
| Yellowstone National Park..... | I, 1940; II, 3745 |
| Broad Creek, Md., improvement..... | I, 476; II, 2229 |
| Broad Creek River, Del., improvement..... | I, 466; II, 2223 |
| Broadkill River, Del., improvement..... | I, 423; II, 2194 |
| Broad Sound, Boston Harbor, Mass., improvement..... | I, 77; II, 1968 |
| Bronx (Harlem) Kills, N. Y., examination and survey..... | I, 263 |
| Bronx River, N. Y., improvement..... | I, 216; II, 2067 |
| Browns Creek, N. Y., improvement..... | I, 307; II, 2116 |
| Brulé Plaquemine Bayou, La., improvement..... | I, 888; II, 2539 |
| Brunswick Harbor, Ga., improvement..... | I, 692; II, 2377 |

| | Page. |
|--|-------------------|
| Brunswick River, N. C., improvement of Cape Fear River below Wilmington..... | I, 598; II, 2312 |
| Budd Inlet, Olympia Harbor, Wash., improvement..... | I, 1762; II, 3358 |
| Buffalo Bayou, Tex.: | |
| Examination and survey..... | I, 1013 |
| Improvement of waterway to Houston..... | I, 961; II, 2575 |
| Buffalo, N. Y.: | |
| Engineering district..... | I, 1557; II, 3225 |
| Examination and surveys..... | I, 1597 |
| Improvement of Black Rock Channel and Tonawanda Harbor..... | I, 1587; II, 3235 |
| Improvement of harbor..... | I, 1563; II, 3229 |
| Operating and care of Black Rock Canal and Ferry Street Bridge..... | I, 1573; II, 3238 |
| Bulkhead lines, establishment..... | I, 1841 |
| Burlington Harbor, Vt., improvement..... | I, 259; II, 2092 |
| Burr Creek, Conn., improvement..... | I, 183; II, 2051 |
| Buzzards Bay, Mass., examination and survey..... | I, 150 |
| Byram River, Port Chester Harbor, N. Y., improvement..... | I, 202; II, 2061 |

C.

| | |
|---|-------------------|
| Caddo Lake, Tex. and La.: | |
| Improvement by construction of dam at foot of..... | I, 1041; II, 2620 |
| Operation and care of dam at foot of..... | I, 1045; II, 2621 |
| Calaveras River, Cal., improvement..... | I, 1651; II, 3237 |
| Caldcasieu Pass and River, La.: | |
| Improvement..... | I, 941; II, 2561 |
| Reexamination..... | I, 949 |
| California Débris Commission..... | I, 1805; II, 3393 |
| Caloosahatchee River, Fla.: | |
| Examination and survey..... | I, 779 |
| Improvement..... | I, 733; II, 2403 |
| Calumet Harbor and River, Ill. and Ind.: | |
| Improvement of harbor (South Chicago Harbor)..... | I, 1409; II, 3090 |
| Improvement of river..... | I, 1412; II, 3092 |
| Cambridge Harbor, Md., improvement..... | I, 460; II, 2220 |
| Camps for training Engineer reserve officers..... | I, 5 |
| Canada, Dominion of: | |
| Commerce through St. Marys Falls Canal..... | I, 1497; II, 3170 |
| Report as to character of vessels expected to use Welland Canal when enlarged by..... | I, 1597 |
| Transmission of electrical power into United States at Niagara Falls..... | I, 1932 |
| Canals: | |
| <i>See also</i> Waterways. | |
| Albemarle and Chesapeake Canal, N. C., improvement..... | I, 536; II, 2266 |
| Appropriation for operation and care..... | I, 43 |
| Bee Tree Shoals Canal, Ala., operating and care..... | I, 1235; II, 2329 |
| Benton Harbor Canal, St. Joseph Harbor, Mich., improvement..... | I, 1430; II, 3107 |
| Black Rock Canal and Ferry Street Bridge, Buffalo, N. Y., operating and care..... | I, 1573; II, 3238 |
| Calaveras River, Cal., to Mormon Channel, San Joaquin River, improvement..... | I, 1651; II, 3233 |
| Cape Cod Canal, examination and survey of approaches to..... | I, 150 |
| Care and maintenance, appropriation for..... | I, 43 |
| Cascades Canal, Columbia River— | |
| Construction..... | I, 1697; II, 3316 |
| Operating and care..... | I, 1711; II, 3324 |
| Chicago Drainage Canal..... | I, 1937 |
| Colbert Shoals Canal, Ala., operating and care..... | I, 1235; II, 2329 |
| Dalles-Celilo Canal, Oreg. and Wash.— | |
| Improvement..... | I, 1700; II, 3316 |
| Operating and care..... | I, 1712; II, 3326 |
| Des Moines Rapids Canal and Dry Dock, Mississippi River, operating and care..... | I, 1123; II, 2723 |

| Canals—Continued. | Page. |
|---|-------------------|
| Dismal Swamp Canal, Va. and N. C., improvement of waterway via..... | I, 534; II, 2285 |
| East Coast Canal, St. Johns River to Key West, Fla., examination..... | I, 779 |
| Elk River Shoals Canal, Ala., operating and care..... | I, 1233; II, 2825 |
| Estherville-Minim Creek Canal, S. C., improvement..... | I, 629; II, 2345 |
| Illinois and Mississippi Canal, Ill.— | |
| Improvement..... | I, 1133; II, 2723 |
| Operating and care..... | I, 1134; II, 2729 |
| Keokuk (Des Moines Rapids) Canal and Dry Dock, Mississippi River, operating and care..... | I, 1128; II, 2723 |
| Lake Washington Canal, Wash.: | |
| Improvement..... | I, 1768; II, 3364 |
| Operating and care..... | I, 1785; II, 3377 |
| Louisville & Portland Canal, Ohio River, Ky.— | |
| Enlargement..... | I, 1244; II, 2877 |
| Operating and care..... | I, 1250; II, 2921 |
| Muscle Shoals Canal, Ala., operating and care..... | I, 1233; II, 2825 |
| Navigation of, regulations for..... | I, 1828 |
| Operation and care, appropriation for..... | I, 43 |
| Portage Lake Canals, Mich.— | |
| Improvement..... | I, 1333; II, 3063 |
| Operating and care..... | I, 1346; II, 3045 |
| Port Arthur Ship Canal, Tex.— | |
| Examination and survey..... | I, 1046 |
| Improvement..... | I, 1014; II, 2597 |
| Regulations for navigation..... | I, 1828 |
| Sabine-Neches Canal— | |
| Contributions for improvement..... | I, 1021; II, 2602 |
| Examination and survey..... | I, 1046 |
| Improvement..... | I, 1018; II, 2602 |
| St. Clair Flats Canal, Mich., operating and care..... | I, 1497; II, 3190 |
| St. Marys Falls Canal, Mich.— | |
| Commercial statistics..... | I, 1497; II, 3170 |
| Improvement..... | I, 1477; II, 3153 |
| Operating and care..... | I, 1496; II, 3166 |
| San Joaquin River, Cal., Mormon Channel to Calaveras River, improvement..... | I, 1651; II, 3233 |
| Sturgeon Bay and Lake Michigan Canal, Wis.— | |
| Improvement..... | I, 1366; II, 3059 |
| Operating and care..... | I, 1400; II, 3061 |
| Welland Canal, report as to character of vessels expected to use canal when enlarged..... | I, 1597 |
| West Galveston Bay and Brazos River Canal, Tex., improvement..... | I, 960; II, 2586 |
| Caney and Live Oak Creeks, Tex., examination and survey..... | I, 1012 |
| Cannes, des, Bayou, La.: | |
| Examination and survey..... | I, 940 |
| Improvement..... | I, 940; II, 2560 |
| Cape Ann, Mass., harbor of refuge, improvement..... | I, 74; II, 1963 |
| Cape Charles City Harbor, Va., improvement..... | I, 530; II, 2263 |
| Cape Cod Canal, examination and survey of approaches to..... | I, 150 |
| Cape Fear River, N. C.: | |
| Defenses..... | I, 6 |
| Examination and survey..... | I, 616 |
| Examination and survey of channel leading into Carolina Beach Pier..... | I, 615 |
| Improvement above Wilmington (locks and dams)..... | I, 601; II, 2313 |
| Improvement above Wilmington (maintenance)..... | I, 605; II, 2323 |
| Improvement at and below Wilmington..... | I, 596; II, 2312 |
| Improvement of Northeast Branch..... | I, 607; II, 2326 |
| Operating and care of Lock and Dam No. 1..... | I, 612; II, 2329 |
| Cape Lookout, N. C., improvement of harbor of refuge..... | I, 596; II, 2311 |
| Cape May, N. J.: | |
| Examination and survey of waterway to New York Bay on coast of New Jersey..... | I, 433 |
| Improvement of Cold Spring Inlet, N. J..... | I, 395; II, 2176 |

| | |
|--|--------------------|
| Cape Vincent Harbor, N. Y.: | Page. |
| Examination and survey | I, 1597 |
| Improvement | I, 1592; II, 3256 |
| Capitol, Washington, D. C., telegraph line | I, 1884; III, 8722 |
| Carolina Beach Pier, Cape Fear River, N. C., examination and survey of
channel leading into | I, 615 |
| Carrabelle Harbor and River, Fla., improvement | I, 780; II, 2427 |
| Cascades Canal, Columbia River, Oreg.: | |
| Construction | I, 1697; II, 3316 |
| Operating and care | I, 1711; II, 3324 |
| Casemates, mining | I, 17 |
| Cat River, Va., improvement of waterway, via | I, 481; II, 2198 |
| Cavallo Pass, Tex.: | |
| Improvement of channel to Aransas Pass | I, 997; II, 2589 |
| Improvement of channel to Port Lavaca | I, 995; II, 2689 |
| Cedar Bayou, Tex., improvement | I, 977; II, 2583 |
| Cedar Creek, Conn., improvement | I, 188; II, 2051 |
| Cello Falls, Columbia River | I, 1703; II, 3318 |
| Chambersia (Anahuac) Channel, Tex., improvement | I, 971; II, 2581 |
| Champlain Lake, N. Y. and Vt.: | |
| Burlington Harbor, Vt., improvement | I, 259; II, 2092 |
| Macdonough Memorials | I, 1990 |
| Narrows, improvement | I, 256; II, 2092 |
| Plattsburg Harbor, N. Y., improvement | I, 262; II, 2094 |
| Port Henry Harbor, N. Y., improvement | I, 264; II, 2095 |
| St. Albans Harbor, Vt., improvement | I, 266; II, 2095 |
| Channels. See Rivers and harbors, Canals and Waterways. | |
| Charles River, Boston, Mass., improvement | I, 77; II, 1988 |
| Charleston, S. C.: | |
| Defenses | I, 8 |
| Engineering district | I, 616; II, 2333 |
| Improvement of harbor | I, 640; II, 2353 |
| Improvement of waterway to McClellanville | I, 638; II, 2351 |
| Charlevoix Harbor, Mich., improvement | I, 1467; II, 3146 |
| Charlotte Harbor, Fla., improvement | I, 789; II, 2406 |
| Charlotte Harbor, N. Y.: | |
| Examination and survey | I, 1597 |
| Improvement | I, 1579; II, 3246 |
| Charts. See Maps and charts. | |
| Chattahoochee River, Ga. and Ala.: | |
| Examination and survey | I, 831 |
| Improvement below Columbus | I, 794; II, 2439 |
| Chattanooga, Tenn., engineering district | I, 1210; II, 2806 |
| Cheat River, Pa. and W. Va., examination for flood control | I, 1827 |
| Cheboygan Harbor, Mich., improvement | I, 1500; II, 3192 |
| Cheesequake Creek, N. J., improvement | I, 337; II, 2138 |
| Chefuncte River, La., improvement | I, 890; II, 2528 |
| Chehalis River, Wash., improvement | I, 1754; II, 3355 |
| Chelsea Creek, Boston Harbor, Mass., improvement | I, 77; II, 1988 |
| Cheneaux Channels, Mich., examination and survey | I, 1521 |
| Chequamegon Bay, Ashland Harbor, Wis., improvement | I, 1327; II, 3035 |
| Chesapeake Bay, Md. and Va.: | |
| Defense at entrance | I, 8 |
| Thimble Shoal, improvement | I, 512; II, 2256 |
| Waterway to Beaufort Inlet, improvement | I, 536; II, 2266 |
| Waterway to sounds of North Carolina (to Pamlico Sound),
improvement | I, 534; II, 2265 |
| York Spit, removal of shoals opposite | I, 434; II, 2201 |
| Chester River, Md., improvement | I, 444; II, 2211 |
| Chester River, Pa., improvement | I, 406; II, 2182 |
| Chicago Harbor and River, Ill.: | |
| Improvement of harbor | I, 1402; II, 3063 |
| Improvement of river | I, 1406; II, 3069 |
| Reexamination of harbor | I, 1430 |
| Chicago, Ill.: | |
| Drainage canal | I, 1937 |
| Engineering district | I, 1401; II, 3063 |

| | Page. |
|---|-------------------|
| Chickasahay River, Miss.: | |
| Examination and survey | I, 876 |
| Improvement | I, 860; II, 2497 |
| Chief of Engineers, officers on duty in the office of the | I, 1965 |
| Chincoteague Inlet and Bay, Va.: | |
| Waterway on coast of Virginia, improvement | I, 431; II, 2198 |
| Waterway to Delaware Bay, improvement | I, 429; II, 2197 |
| Chipola River, Fla.: | |
| Improvement of lower river | I, 785; II, 2432 |
| Improvement of upper river | I, 789; II, 2432 |
| Reexamination of lower and upper rivers | I, 831 |
| Chippewa River, Wis., operating snag and dredge boats | I, 1131; II, 2726 |
| Chocolate Bayou, Tex., improvement | I, 982; II, 2585 |
| Choctawhatchee River, Fla. and Ala., improvement | I, 804; II, 2448 |
| Choptank River, Md., improvement | I, 455; II, 2217 |
| Christiana River, Del., improvement of Wilmington Harbor | I, 406; II, 2182 |
| Cincinnati, Ohio: | |
| First engineering district | I, 1287; II, 2975 |
| Second engineering district | I, 1302; II, 3003 |
| Civilian assistants to Engineer officers | I, 32 |
| Civil War, Women of, Memorial to | I, 1905; II, 3725 |
| Clalborne Harbor, Md., improvement | I, 449; II, 2214 |
| Clason Point Harbor, N. Y., examination and survey | I, 268 |
| Clatskanie River, Oreg., improvement | I, 1726; II, 3340 |
| Clear Creek, Tex., improvement | I, 979; II, 2583 |
| Clearwater Harbor, Fla., improvement of channel to Tampa Bay | I, 745; II, 2410 |
| Clearwater River, Idaho, examination and survey | I, 1715 |
| Cleveland, Ohio: | |
| Engineering district | I, 1522; II, 3205 |
| Improvement of harbor | I, 1540; II, 3214 |
| Clinch River, Tenn., improvement | I, 1239; II, 2632 |
| Clinton River, Mich., improvement | I, 1513; II, 3201 |
| Coast Artillery, equipment of armories for militia | I, 20 |
| Coast defenses | I, 8 |
| Coenties Reef, New York Harbor, N. Y., removal | I, 220; II, 2073 |
| Cohansey River, N. J., improvement | I, 390; II, 2174 |
| Coinjock Bay, N. C., improvement of waterway via | I, 536; II, 2266 |
| Colbert Shoals Canal, Tennessee River, Ala., operating and care | I, 1235; II, 2629 |
| Cold Spring Inlet, N. J., improvement | I, 395; II, 2176 |
| Coldwater River, Miss., improvement | I, 1075; II, 2644 |
| Colorado River, Ariz., improvement | I, 1597; II, 3261 |
| Colorado River, Tex.: | |
| Examination and survey | I, 1013 |
| Examination for flood control | I, 1013 |
| Columbia River, Oreg. and Wash.: | |
| Bakers Bay Channel, examination and survey | I, 1746 |
| Cascades Canal— | |
| Construction | I, 1697; II, 3316 |
| Operating and care | I, 1711; II, 3324 |
| Cello Falls to Snake River, including tributaries, improvement | |
| from | I, 1703; II, 3318 |
| Cello Falls to The Dalles Rapids, improvement | I, 1700; II, 3316 |
| Cello Falls to The Dalles Rapids, operating and care of canal and locks | I, 1712; II, 3336 |
| Defenses | I, 8 |
| Examinations and surveys | I, 1714, 1715 |
| Examination of channel to Rainier, Oreg. | I, 1746 |
| Examination of channel to St. Helena, Oreg. | I, 1747 |
| Mouth, defenses | I, 8 |
| Mouth, improvement | I, 1716; II, 3329 |
| Mouth to Willamette River, improvement | I, 1719; II, 3333 |
| Threemile Rapids, improvement | I, 1700; II, 3316 |
| Wenatchee, Wash., to Kettle Falls, improvement | I, 1781; II, 3376 |
| Youngs Bay Channel, examination and survey | I, 1747 |
| Columbia Slough, Oreg., examination and survey | I, 1715 |
| Commencement Bay, Wash., improvement | I, 1764; II, 3359 |

| | |
|---|--------------------|
| Commissioned officers: | Page. |
| Duties | I, 3 |
| Engineer Officers' Reserve Corps | I, 4 |
| Increase in number of, provided by act of June 8, 1916 | I, 6 |
| Officers on duty in office of the Chief of Engineers | I, 1965 |
| Number, distribution, and changes during the year | I, 8 |
| Commissions: | |
| See also Boards. | |
| Arlington Memorial Bridge Commission | I, 1906; III, 3727 |
| California Débris Commission | I, 1805; II, 3393 |
| District of Columbia Armory Commission | I, 1904; III, 3725 |
| Fine Arts Commission | I, 1904; III, 3725 |
| Mississippi River Commission | I, 1821; III, 3411 |
| Permanent International Association of Congresses of Navigation | I, 1823 |
| Public buildings | I, 1906; III, 3728 |
| Compton Creek, N. J., improvement | I, 843; II, 2140 |
| Conduit Road, Md. and D. C., surfacing and improvement | I, 1876; III, 3693 |
| Conecuh River, Ala., improvement | I, 813; II, 2456 |
| Coney Island Channel, New York Harbor, N. Y., improvement | I, 275; II, 2101 |
| Coney Island, N. Y., examination and survey of Sea Gate | I, 810 |
| Congaree River, S. C.: | |
| Improvement | I, 633; II, 2348 |
| Operating and care of lock and dam | I, 637; II, 2350 |
| Congresses of Navigation, Permanent International Association of | I, 1823 |
| Conneaut Harbor, Ohio, improvement | I, 1552; II, 8220 |
| Connecticut River, Mass. and Conn.: | |
| Examination and survey, Hartford to Long Island Sound | I, 200 |
| Improvement above Hartford, Conn. | I, 162; II, 2042 |
| Improvement below Hartford, Conn. | I, 164; II, 2043 |
| Contentnea Creek, N. C., improvement | I, 571; II, 2292 |
| Contingencies, Engineer Department, Philippine Islands | I, 27 |
| Contingencies of rivers and harbors, estimate of appropriation | I, 1828 |
| Continuing contracts: | |
| Appropriations estimate | I, 45 |
| Black Rock Harbor, N. Y. | I, 1567; II, 3285 |
| Delaware River, Pa. and N. J., Philadelphia to the sea | I, 358; II, 2149 |
| Duluth-Superior Harbor, Minn. and Wis. | I, 1319; II, 3080 |
| East River and Hell Gate, N. Y. | I, 220; II, 2069 |
| Estimate of appropriations for | I, 45 |
| Hudson River, N. Y. | I, 237; II, 2080 |
| Kahului Harbor, Hawaii | I, 1795; II, 3388 |
| Milwaukee Harbor, Wis. | I, 1385; II, 3071 |
| Mississippi River, flood control | I, 1821; III, 3411 |
| Sacramento River, flood control | I, 1818; II, 3405 |
| San Francisco Harbor, Cal. | I, 1613; II, 3287 |
| South Haven Harbor, Mich. | I, 1435; II, 3111 |
| Willapa River and Harbor, Wash. | I, 1748; II, 3353 |
| Cooper River (Creek), N. J., improvement | I, 376; II, 2187 |
| Coosa River, Ga. and Ala.: | |
| Examination and survey | I, 831 |
| Improvement | I, 822; II, 2465 |
| Operating and care of locks and dams | I, 829; II, 2469 |
| Reexamination | I, 831 |
| Coos Bay, Harbor, and River, Oreg.: | |
| Examination from the entrance to Smiths Mill | I, 1714 |
| Examination of entrance | I, 1713 |
| Improvement of entrance to bay and harbor | I, 1671; II, 3303 |
| Improvement of river | I, 1675; II, 3305 |
| Coquille Bar and Harbor, Oreg., examination to the city of Bandon | I, 1714 |
| Coquille River, Oreg.: | |
| Examination from Coquille City to the entrance | I, 1714 |
| Improvement | I, 1687; II, 3301 |
| Core Creek, N. C., improvement of waterway via | I, 576; II, 2296 |
| Core Sound, N. C., improvement of waterway to Beaufort Harbor | I, 582; II, 2301 |
| Corney Bayou, La., improvement | I, 1066; II, 2637 |
| Corozal, Canal Zone, engineer depot | I, 85 |

| Corps of Engineers: | Page. |
|--|--------------------|
| Duties..... | i, 3 |
| Increase in, provided by act of June 3, 1916..... | i, 6 |
| Laws of Sixty-fourth Congress, second session, affecting the..... | iii, 3761 |
| Officers on duty in Office of the Chief of Engineers..... | i, 1965 |
| Personnel— | |
| Commissioned, number, distribution, and changes during the year..... | i, 3 |
| Engineer Enlisted Reserve Corps..... | i, 7 |
| Engineer Officers' Reserve Corps..... | i, 4 |
| Increase of companies to maximum strength..... | i, 6 |
| New organizations..... | i, 6 |
| Retired officers on active duty..... | i, 4 |
| Corpus Christi to Galveston, Tex., waterway: | |
| Aransas Pass—Corpus Christi Channel..... | i, 999; ii, 2590 |
| Brazos River—Matagorda Bay Channel..... | i, 991; ii, 2587 |
| Guadalupe River to Victoria, Tex..... | i, 993; ii, 2588 |
| Pass Cavallo—Aransas Pass Channel..... | i, 997; ii, 2589 |
| West Galveston Bay—Brazos River Canal..... | i, 989; ii, 2586 |
| Corsica River, Md., improvement..... | i, 446; ii, 2212 |
| Cote Blanche Bay, La., improvement of waterway via..... | i, 921; ii, 2549 |
| Cottonwood River, Kans., examination for flood control..... | i, 1121 |
| Courtableau Bayou, La., examination and survey..... | i, 949 |
| Cowhead River, Ga., improvement..... | i, 870; ii, 2370 |
| Cowlitz River, Wash., improvement..... | i, 1739; ii, 3347 |
| Crater Lake National Park, Oreg., improvement..... | i, 1956; iii, 3759 |
| Craven Shoal, N. Y., Harbor, improvement..... | i, 289; ii, 2097 |
| Crescent Lake and Dunns Creek, Fla., improvement..... | i, 710; ii, 2391 |
| Crisfield Harbor, Md., improvement..... | i, 474; ii, 2228 |
| Croatan Sound, N. C., improvement of waterway via..... | i, 534; ii, 2265 |
| Crystal River, Fla., improvement..... | i, 750; ii, 2412 |
| Cuba; defenses of Guantanamo Bay..... | i, 20 |
| Cumberland River, Ky. and Tenn.: | |
| Above Nashville, improvement..... | i, 1203; ii, 2797 |
| Below Nashville, improvement..... | i, 1197; ii, 2785 |
| Operating and care of locks and dams..... | i, 1209; ii, 2800 |
| Cumberland Sound, Ga. and Fla.: | |
| Improvement..... | i, 695; ii, 2379 |
| Improvement of waterway between Savannah and Fernan-
dina..... | i, 664; ii, 2367 |
| Improvement of waterways to St. Johns River, Fla..... | i, 667; ii, 2368 |
| Current River, Ark. and Mo., improvement..... | i, 1103; ii, 2669 |
| Curtis Bay, Baltimore, Md., improvement of channel to..... | i, 434; ii, 2201 |
| Cuyahoga River, Cleveland, Ohio, improvement..... | i, 1540; ii, 3214 |
| Cypress Bayou, Tex. and La.: | |
| Construction of dam at foot of Caddo Lake..... | i, 1041; ii, 2620 |
| Improvement of, including connecting lakes between Shreve-
port, La., and Jefferson, Tex..... | i, 1041; ii, 2620 |
| Operating and care of dam at foot of Caddo Lake..... | i, 1045; ii, 2621 |
| Cypress Top Outlet, Choctawhatchee River, Fla., improvement..... | i, 804; ii, 2448 |

D.

| | |
|--|--------------------|
| Dalecarlia Reservoir, Washington Aqueduct, D. C..... | i, 1876; iii, 3681 |
| Dallas, Tex., engineering district..... | i, 1013; ii, 2597 |
| Dalles-Oelilo Canal, Oreg. and Wash.: | |
| Improvement..... | i, 1700; ii, 3316 |
| Operating and care..... | i, 1712; ii, 3328 |
| Dams, permits for erection of..... | i, 1839 |
| D'Arbonne Bayou, La., improvement..... | i, 1066; ii, 2637 |
| Darien Harbor, Ga., improvement..... | i, 674; ii, 2371 |
| Days Creek and Sulphur River, Tex. and Ark., examination and survey..... | i, 1047 |
| Deal Island, Md., improvement of lower thoroughfare at Wenona..... | i, 473; ii, 2227 |
| Débris, mine in California..... | i, 1805; ii, 3398 |
| Deep Bay, N. C., improvement of waterway to Swan Quarter Bay..... | i, 554; ii, 2279 |
| Deep Creek Branch, Elizabeth River, Va., improvement of water-
way via..... | i, 534; ii, 2285 |

| | Page. |
|---|--------------------|
| Defenses, seacoast | i, 8 |
| Delaware Bay and River, Pa., N. J., and Del.: | |
| Breakwater and harbor of refuge in bay, improvement | i, 373; ii, 2164 |
| Defenses | i, 8 |
| Examinations and surveys of river | i, 375 |
| Improvement of river at Trenton | i, 352; ii, 2145 |
| Improvement of river near Neversink River | i, 351; ii, 2145 |
| Improvement of river, Philadelphia to the sea | i, 358; ii, 2149 |
| Improvement of river, Philadelphia to Trenton | i, 355; ii, 2147 |
| Lewes, Del., iron pier near, improvement | i, 371; ii, 2164 |
| Marcushook, Pa., improvement of ice harbor | i, 370; ii, 2164 |
| Philadelphia and Camden Harbors, improvement | i, 355; ii, 2147 |
| Waterway to Chincoteague Bay, improvement | i, 429; ii, 2197 |
| Waterway to Rehoboth Bay, improvement | i, 426; ii, 2195 |
| Departments, executive, Washington, D. C., telegraph line | i, 1884; iii, 3722 |
| Depere, Wis., improvement of Green Bay Harbor | i, 1357; ii, 3054 |
| Depots, engineer | i, 32 |
| Derelicts. <i>See</i> Wrecks. | |
| Des Cannes Bayou, La.: | |
| Examination and survey | i, 949 |
| Improvement | i, 940; ii, 2560 |
| Des Glazes Bayou, La., examination and survey | i, 949 |
| Des Moines Rapids Canal and Dry Dock, Mississippi River, operating and care | i, 1128; ii, 2723 |
| Detroit, Mich., engineering district | i, 1476; ii, 3153 |
| Detroit River, Mich.: | |
| Examination and survey of Livingstone Channel | i, 1521 |
| Improvement | i, 1492; ii, 3161 |
| Improvement of channels in waters connecting Great Lakes | i, 1477; ii, 3153 |
| Dickinson Bayou, Tex., improvement | i, 981; ii, 2584 |
| Dismal Swamp Canal, Va. and N. C., improvement of waterway via | i, 534; ii, 2265 |
| District of Columbia: | |
| Anacostia River, reclamation of flats | i, 1861; iii, 3675 |
| Aqueduct Bridge across Potomac River, repair | i, 1866 |
| Aqueduct, filtration plant | i, 1876; iii, 3681 |
| Aqueduct, maintenance and repair | i, 1876; iii, 3681 |
| Armory commission of | i, 1904; iii, 3725 |
| Engineer depot | i, 32 |
| Engineer post and school, buildings for | i, 42 |
| Executive Mansion and Office | i, 1884; iii, 3696 |
| Highway Bridge, Potomac River | i, 1884; iii, 3722 |
| Improvement of Anacostia River | i, 485; ii, 2235 |
| Improvement of Potomac River | i, 482; ii, 2233 |
| Key Bridge, Potomac River | i, 1872 |
| McMillan Park Reservoir | i, 1876; iii, 3692 |
| Public buildings and grounds, and Washington Monument | i, 1884; iii, 3697 |
| Telegraph line connecting executive departments | i, 1884; iii, 3722 |
| Water supply, increase | i, 1876; iii, 3692 |
| Doboy Bar, Ga., improvement | i, 674; ii, 2371 |
| Dock lines, establishment | i, 1841 |
| Dog Island Harbor, St. George Sound, Fla., improvement | i, 780; ii, 2427 |
| Dog River, Miss., improvement | i, 852; ii, 2493 |
| Dolphins, permits for erection of | i, 1839 |
| Dorchester Bay, Mass., improvement | i, 103; ii, 2009 |
| Double Bayou, Tex., improvement | i, 969; ii, 2580 |
| Drainage Canal at Chicago, Ill. | i, 1937 |
| Drawbridges: | |
| <i>See also</i> Bridges. | |
| Rules for opening | i, 1829 |
| Drawings. <i>See</i> Maps and charts. | |
| Drift, removal from New York Harbor | i, 281; ii, 2104 |
| Dry Straits, Alaska, examination | i, 1791 |
| Duck Creek (Smyrna River), Del., improvement | i, 411; ii, 2185 |
| Duck Island Harbor, Conn., construction of harbor of refuge | i, 168; ii, 2045 |

| | Page. |
|---|-------------------|
| Duluth, Minn.: | |
| Engineering district..... | I, 1314; II, 3027 |
| Examination and survey of harbor..... | I, 1347 |
| Improvement of Duluth-Superior Harbor..... | I, 1319; II, 3030 |
| Dunkirk Harbor, N. Y., improvement..... | I, 1530; II, 3227 |
| Dunns Creek and Crescent Lake, Fla., improvement..... | I, 710; II, 2391 |
| E. | |
| East Bay Bayou, Tex., improvement..... | I, 968; II, 2579 |
| East Bay, Fla., improvement of waterway via..... | I, 796; II, 2443 |
| East (Ambrose) Channel, New York Harbor, N. Y., improvement..... | I, 269; II, 2097 |
| East Chester Creek, N. Y., improvement..... | I, 211; II, 2065 |
| East Coast Canal, St. Johns River to Key West, Fla., examination..... | I, 779 |
| Eastern Bay, Claiborne Harbor, Md., improvement..... | I, 449; II, 2214 |
| Eastern Branch (Anacostia River), D. C., improvement..... | I, 485; II, 2235 |
| Eastern Branch, Elizabeth River, Va., improvement..... | I, 508; II, 2233 |
| Eastern entrance to Long Island Sound, defenses..... | I, 8 |
| East Norwalk Harbor, Conn., improvement..... | I, 191; II, 2055 |
| East Pass, Carrabelle Harbor, Fla., improvement..... | I, 780; II, 2427 |
| East Pearl River, Miss., improvement..... | I, 870; II, 2502 |
| East River, Brunswick Harbor, Ga., improvement..... | I, 692; II, 2377 |
| East River, N. Y., improvement, including Coenties Reef..... | I, 220; II, 2069 |
| Echo Bay Harbor, New Rochelle, N. Y., improvement..... | I, 208; II, 2064 |
| Echo Bay, N. Y., examination and survey..... | I, 263 |
| Eel River, Cal., examination and survey..... | I, 1641 |
| Electrical power: | |
| Mississippi River between St. Paul and Minneapolis, Minn..... | I, 1137; II, 2733 |
| Niagara River, N. Y., control and regulation..... | I, 1332 |
| Tennessee River, Elk River Shoals to Florence, Ala..... | I, 1233; II, 2325 |
| Elizabeth River, N. J., improvement..... | I, 325; II, 2131 |
| Elizabeth River, Va.: | |
| Improvement of Norfolk Harbor, including Eastern, Southern, and Western Branches..... | I, 508; II, 2233 |
| Improvement of waterway to sounds of North Carolina via Pasquotank River..... | I, 534; II, 2265 |
| Elk River, Md.: | |
| Examination and survey..... | I, 431 |
| Improvement..... | I, 440; II, 2208 |
| Elk River Shoals Canal, Ala., operating and care..... | I, 1233; II, 2325 |
| El Paso, Tex., engineer depot..... | I, 35 |
| Embankments and sea walls..... | I, 15 |
| Emplacements, modernizing..... | I, 10 |
| Employees, civilian assistants to Engineer officers..... | I, 32 |
| Endicott Board..... | I, 8 |
| Enfield Rapids, Connecticut River, Conn., improvement..... | I, 162; II, 2042 |
| Engineer Department, Philippine Islands, contingencies..... | I, 27 |
| Engineer depots..... | I, 32 |
| Engineer Enlisted Reserve Corps..... | I, 7 |
| Engineer officers, civilian assistants to..... | I, 32 |
| Engineer Officers' Reserve Corps..... | I, 4 |
| Engineer officers' training camps..... | I, 6 |
| Engineer operations in the field..... | I, 33 |
| Engineer Post and School, Washington, D. C., buildings..... | I, 42 |
| Engineer School, Washington Barracks, D. C..... | I, 41 |
| Engineers, Office of the Chief of, officers on duty..... | I, 1905 |
| Engineers, The Board of..... | I, 7 |
| Engineer troops: | |
| Enlisted Reserve Corps..... | I, 7 |
| Equipment of..... | I, 36 |
| Increase of companies to maximum strength..... | I, 6 |
| New engineer organizations..... | I, 6 |
| English Kills, Newtown Creek, N. Y., improvement..... | I, 234; II, 2107 |
| Enlisted Reserve Corps..... | I, 7 |

| Equipment: | Page. |
|--|--------------------|
| Coast Artillery, armories, Organized Militia | i, 20 |
| Engineer, of troops | i, 88 |
| Officers' schools, military posts | i, 41, 42 |
| Erie Basin, N. Y., improvement of channel in Lake Erie | i, 1567; ii, 8235 |
| Erie Harbor, Pa., improvement | i, 1557; ii, 8225 |
| Erie Lake: | |
| Black Rock Harbor, improvement of entrance to | i, 1567; ii, 8235 |
| Channels in waters connecting Great Lakes, improvement | i, 1477; ii, 8153 |
| Examination of harbors and connecting waters of Great Lakes | i, 1597 |
| Surveys, charts, etc., of northern and northwestern lakes | i, 1916; iii, 8781 |
| Water levels | i, 1926; iii, 8740 |
| Waterway to Lake Michigan, examination | i, 1557 |
| Waterway to Lake Ontario, examination | i, 1597 |
| Escambia River, Fla.: | |
| Examination and survey | i, 880 |
| Improvement | i, 818; ii, 2456 |
| Estherville-Minim Creek Canal, S. C., improvement | i, 629; ii, 2845 |
| Estimates of appropriations required: | |
| Civilian assistants to Engineer officers | i, 82 |
| Contingencies, Engineer Department, Philippine Islands | i, 27 |
| Engineer depots | i, 86 |
| Engineer equipment of troops | i, 88 |
| Engineer operations in the field | i, 89 |
| Examinations, surveys, and contingencies | i, 1828 |
| Fortifications | i, 20, 25 |
| Fort Leavenworth, purchase of lithograph press | i, 43 |
| Maps, War Department | i, 80 |
| Military surveys and maps | i, 82 |
| Miscellaneous civil works | i, 1849 |
| Panama Canal | i, 29 |
| Rivers and harbors, etc. | i, 45 |
| Roads in insular possessions | i, 26 |
| Eureka, Cal., improvement of channel in front of | i, 1688; ii, 3281 |
| Evanston, Ill., harbor of refuge, examination and survey | i, 1430 |
| Everett Harbor, Wash.: | |
| Examination and survey | i, 1791 |
| Improvement | i, 1772; ii, 3373 |
| Examination of rivers and harbors, estimate of appropriation for | i, 1828 |
| Executive departments, Washington, D. C., telegraph line | i, 1884; iii, 3722 |
| Executive Mansion and Office, Washington, D. C., maintenance and repair of | i, 1884; iii, 3698 |
| Expenditures: | |
| Fortifications | i, 17, 24 |
| Rivers and harbors | i, 43 |
| Experimental towboats, board on | i, 1825; ii, 3405 |

F.

| | |
|--|--------------------|
| Fairhaven Harbor, Mass., improvement | i, 123; ii, 2022 |
| Fairport Harbor, Ohio, improvement | i, 1545; ii, 3217 |
| Falla, Bogue, La., improvement | i, 890; ii, 2528 |
| Fall River, Harbor, Mass., improvement | i, 126; ii, 2024 |
| Falls of Ohio River, Louisville, Ky., improvement | i, 1244; ii, 2853 |
| Fancy Bluff Creek, Ga., improvement | i, 675; ii, 2872 |
| Feather River, Cal.: | |
| Improvement | i, 1662; ii, 3299 |
| Work of California Debris Commission | i, 1815; ii, 3401 |
| Fernandina Harbor, Fla.: | |
| Improvement | i, 695; ii, 2379 |
| Improvement of waterway to Savannah, Ga. | i, 664; ii, 2367 |
| Fighting Island Channel, Detroit River, Mich., improvement | i, 1492; ii, 8161 |
| Filtration plant, Washington Aqueduct, D. C. | i, 1876; iii, 8681 |
| Fine Arts Commission | i, 1904; iii, 8725 |
| Fire control at fortifications | i, 11, 24 |
| Fishing Creek, N. C., improvement | i, 559; ii, 2288 |

| | Page |
|---|--------------------|
| Fish traps, or weirs, permits for construction..... | I, 1839 |
| Fivemile River Harbor, Conn., improvement..... | I, 194; II, 2056 |
| Flathead Lake and River, Mont.: | |
| Examination..... | I, 1791 |
| Improvement of Polson Bay..... | I, 1785; II, 3379 |
| Flint River, Ga.: | |
| Examination and survey..... | I, 831 |
| Improvement..... | I, 791; II, 2436 |
| Floating plant, statement of..... | I, 1828; III, 3805 |
| Flood control: | |
| In Ohio River Valley, examinations and surveys..... | I, 1827 |
| In State of Kansas, examination for..... | I, 1121 |
| On Mississippi River..... | III, 3411 |
| On Sacramento River, Cal..... | II, 3405 |
| Florida: | |
| Removal of water hyacinths from waters of State..... | I, 775; II, 2426 |
| Waterway along Gulf coast of, connecting St. George Sound with Tampa Bay, examination and survey..... | I, 779 |
| Flushing Bay and Creek, N. Y., improvement..... | I, 287; II, 2108 |
| Fore (Weymouth) River, Mass., improvement..... | I, 105; II, 2012 |
| Fore River, Portland, Me., improvement..... | I, 61; II, 1980 |
| Forked Deer River, Tenn., examination and survey..... | I, 1210 |
| Fort George River, Fla., improvement of waterway via..... | I, 667; II, 2388 |
| Fortifications: | |
| Appropriations..... | I, 10-17 |
| Batteries..... | I, 10 |
| Batteries in insular possessions..... | I, 20 |
| Board of Engineers, The..... | I, 7 |
| Board on Fortifications or other Defenses (Endicott Board)..... | I, 8 |
| Electrical and other supplies, insular possessions..... | I, 23 |
| Electrical installations..... | I, 12 |
| Electrical installations, insular possessions..... | I, 21 |
| Estimates of appropriations required..... | I, 20, 25 |
| Fire control..... | I, 11 |
| Fire control, insular possessions..... | I, 24 |
| General statement and progress of work..... | I, 8 |
| Isthmian Canal..... | I, 27 |
| Land defense..... | I, 15 |
| Land defenses, insular possessions..... | I, 22 |
| Mine-defense structures, insular possessions..... | I, 23 |
| Modernizing older emplacements..... | I, 10 |
| National Coast Defense Board..... | I, 8 |
| Panama Canal..... | I, 27 |
| Plans..... | I, 14 |
| Preservation and repair..... | I, 12 |
| Preservation and repair, insular possessions..... | I, 22 |
| Preservation and repair of torpedo structures..... | I, 12 |
| Projects..... | I, 8, 9, 10 |
| Reserve equipment, insular possessions..... | I, 23 |
| Roads, trails, etc..... | I, 15 |
| Sandy Hook Reservation, N. J., protection of..... | I, 15 |
| Searchlights..... | I, 12 |
| Searchlights, insular possessions..... | I, 21 |
| Sea walls— | |
| Defenses of Galveston, Tex..... | I, 16 |
| Embankments and..... | I, 15 |
| In Hawaiian Islands..... | I, 23 |
| Sites..... | I, 12 |
| Sites, insular possessions..... | I, 22 |
| Submarine mines..... | I, 17 |
| Supplies for seacoast defenses..... | I, 14 |
| Fort Leavenworth, Kans.: | |
| Engineer depot..... | I, 94 |
| Purchase of lithograph press for Army Service Schools..... | I, 43 |
| Fort Pierre, S. Dak., improvement of Missouri River at..... | I, 1181; II, 2771 |
| Fort Point Channel, Boston Harbor, Mass., improvement..... | I, 77; II, 1988 |

| | Page. |
|--|--------------------|
| Fort Riley Military Reservation, Kans., protection of bank line of Republican River in front of..... | I, 1196; II, 2783 |
| Fort Sam Houston, Tex., engineer depot..... | I, 85 |
| Fox River, Wis.: | |
| Improvement..... | I, 1860; II, 3057 |
| Improvement of Green Bay Harbor..... | I, 1857; II, 3054 |
| Operating and care of locks and dams..... | I, 1860; II, 3079 |
| Reexamination..... | I, 1401 |
| Frankfort Harbor, Mich., improvement..... | I, 1464; II, 3142 |
| Franklin, La.: | |
| Improvement of waterway to Mermentau..... | I, 921; II, 2549 |
| Operating and care of Schooner Bayou Lock..... | I, 929; II, 2553 |
| Freeport Harbor, Tex., improvement..... | I, 1002; II, 2592 |
| French Broad River, Tenn., improvement..... | I, 1236; II, 2830 |
| Front River, Ga.: | |
| Examination and survey..... | I, 696 |
| Improvement of Sapelo Harbor..... | I, 672; II, 2370 |
| G. | |
| Gaging: | |
| Mississippi River and principal tributaries..... | I, 1152; II, 2740 |
| Northern and northwestern lakes, level..... | I, 1926; III, 3740 |
| Galena River, Ill., operating snag and dredge boats..... | I, 1181; II, 2727 |
| Galveston and Sabine section of Inland Waterway, Tex., examination and survey..... | I, 1018 |
| Galveston Bay and Harbor, Tex.: | |
| Examination and survey of harbor and channel..... | I, 1013 |
| Improvement of channel across Hanna Reef, Ladies Pass..... | I, 968; II, 2579 |
| Improvement of Galveston Channel..... | I, 953; II, 2568 |
| Improvement of Galveston-Texas City Channel..... | I, 967; II, 2572 |
| Improvement of harbor entrance..... | I, 950; II, 2567 |
| Improvement of Port Bolivar Channel..... | I, 959; II, 2574 |
| Improvement of waterway to Houston..... | I, 961; II, 2575 |
| Improvement of West Bay..... | I, 959; II, 2586 |
| Galveston, Tex.: | |
| Defenses..... | I, 8 |
| Engineering district..... | I, 949; II, 2567 |
| Sea walls..... | I, 16 |
| Galveston to Corpus Christi, Tex., waterway: | |
| Aransas Pass-Corpus Christi Channel..... | I, 999; II, 2590 |
| Brazos River-Matagorda Bay Channel..... | I, 991; II, 2587 |
| Guadalupe River to Victoria, Tex..... | I, 993; II, 2588 |
| Pass Cavallo-Aransas Pass Channel..... | I, 997; II, 2589 |
| West Galveston Bay-Brazos River Canal..... | I, 999; II, 2596 |
| Gasconade River, Mo., improvement..... | I, 1191; II, 2779 |
| Gedney Channel, New York Harbor, N. Y., improvement..... | I, 269; II, 2097 |
| Genesee River, Charlotte Harbor, N. Y., improvement..... | I, 1579; II, 3246 |
| George, Lake, channels in waters connecting Great Lakes, improvement..... | I, 1477; II, 3158 |
| George, Lake, St. Johns River, Fla., improvement..... | I, 707; II, 2389 |
| Georges River, Me., improvement..... | I, 57; II, 1979 |
| Georgetown Harbor, D. C.: | |
| Improvement of Potomac River at..... | I, 482; II, 2233 |
| Key Bridge across Potomac River at..... | I, 1872 |
| Georgetown Harbor, S. C., improvement..... | I, 616; II, 2333 |
| Germantown, Pa., memorial monument..... | I, 1962 |
| Glaizes, des, Bayou, La., examination and survey..... | I, 949 |
| Gloucester Harbor, Mass., improvement..... | I, 87; II, 1997 |
| Government telegraph line, Washington, D. C..... | I, 1884; III, 3722 |
| Gowanus Creek Channel, New York Harbor, N. Y., improvement..... | I, 279; II, 2108 |
| Grand Calumet River, Ill. and Ind., improvement..... | I, 1412; II, 3092 |
| Grand Haven Harbor, Mich., improvement..... | I, 1448; II, 3118 |
| Grand Lake, Mermentau River, La., improvement..... | I, 932; II, 2556 |
| Grand Marais, Mich., improvement of harbor of refuge..... | I, 1848; II, 3042 |
| Grand Marais, Minn., improvement of harbor..... | I, 1815; II, 3027 |

| | Page. |
|--|--------------------|
| Grand Rapids, Mich., engineering district..... | i, 1430; ii, 3107 |
| Grand Rapids, Wabash River, lock and dam, operating and care..... | i, 1282; ii, 2867 |
| Grand River, Fairport Harbor, Ohio, improvement..... | i, 1545; ii, 3217 |
| Grand River, La., improvement..... | i, 906; ii, 2588 |
| Grand River, Mich.: | |
| Improvement..... | i, 1446; ii, 3124 |
| Improvement of Grand Haven Harbor..... | i, 1443; ii, 3118 |
| Grants Pass, Ala., improvement of waterway via..... | i, 837; ii, 2478 |
| Gravesend Bay, N. Y., examination and survey..... | i, 310 |
| Grays Harbor, Wash.: | |
| Examination of bar..... | i, 1790 |
| Improvement between Aberdeen and the entrance..... | i, 1754; ii, 3355 |
| Improvement of entrance..... | i, 1751; ii, 3354 |
| Grays River, Wash., improvement..... | i, 1742; ii, 3340 |
| Great Kills, Staten Island, N. Y., examination and survey..... | i, 350 |
| Great Lakes: | |
| Channels in waters connecting, improvement..... | i, 1477; ii, 3153 |
| Commercial statistics, Sault Ste. Marie Canals, Mich..... | i, 1497; ii, 3171 |
| Control and regulation of waters of Niagara River, and preservation of Niagara Falls..... | i, 1931 |
| Examination of harbors and connecting waters of..... | i, 1597 |
| Surveys, charts, etc., of northern and northwestern lakes..... | i, 1916; iii, 3731 |
| Water levels..... | i, 1926; iii, 3740 |
| Great Peedee River, S. C., improvement..... | i, 625; ii, 2343 |
| Great Salt Pond, Block Island, R. I., improvement..... | i, 146; ii, 2085 |
| Great Sodus Bay, N. Y., improvement of harbor..... | i, 1583; ii, 3240 |
| Great South Bay, N. Y., improvement..... | i, 304; ii, 2114 |
| Green Bay Harbor, Wis., improvement..... | i, 1357; ii, 3054 |
| Green Jacket Shoal, Providence River, R. I., removal..... | i, 133; ii, 2028 |
| Green River, Ky., operating and care of locks and dams..... | i, 1296; ii, 2900 |
| Greenwich Harbor, Conn., improvement..... | i, 198; ii, 2050 |
| Greenwood Lake, N. Y., examination and survey..... | i, 350 |
| Grosse Pointe Channel, Lake St. Clair, Mich., reexamination..... | i, 1521 |
| Grossetete Bayou, La., improvement..... | i, 909; ii, 2540 |
| Grounds, public, District of Columbia..... | i, 1884; iii, 3697 |
| Guadalupe River, Tex., improvement from Victoria to Aransas Pass—Pass Cavallo Channel..... | i, 993; ii, 2588 |
| Guantanamo Bay, Cuba, defenses of..... | i, 20 |
| Gulf of Mexico: | |
| Examination and survey of channel through Johns Pass to Boca Ceiga Bay..... | i, 778 |
| Examination and survey of channel through St. Georges Sound to Apalachicola, Fla..... | i, 831 |
| Gulfport Harbor, Miss., improvement of channel to Ship Island Harbor..... | i, 855; ii, 2495 |
| Gull Lake, Minn., reservoir dam: | |
| Construction..... | i, 1146; ii, 2737 |
| Operating and care..... | i, 1151; ii, 2739 |
| Gun batteries..... | i, 10, 20 |
| Gunnisons Cut, improvement of waterway via..... | i, 667; ii, 2368 |

H.

| | |
|--|-------------------|
| Habana Harbor, Cuba, removal of wreck of <i>Maine</i> | i, 1824 |
| Hackensack River, N. J.: | |
| Examinations and surveys..... | i, 350 |
| Improvement..... | i, 317; ii, 2126 |
| Hales Bar lock and dam, Tennessee River, operating and care..... | i, 1232; ii, 2834 |
| Hampton Roads, Va.: | |
| Defenses..... | i, 8 |
| Improvement of approaches to Norfolk Harbor..... | i, 508; ii, 2253 |
| Hanna Reef, Ladies Pass, Tex., improvement of channel..... | i, 968; ii, 2579 |
| Hanson Canal, improvement of waterway via..... | i, 921; ii, 2540 |
| Harbor Beach, Mich., harbor of refuge: | |
| Improvement..... | i, 1508; ii, 3196 |
| Reexamination..... | i, 1821 |

| | Page. |
|--|--------------------|
| Harbor Cove, Gloucester, Mass., improvement..... | I, 87; II, 1997 |
| Harbor Island and Port Aransas, Tex., to Rockport, examination and survey of channel..... | I, 1013 |
| Harbor Island Harbor, Tex., improvement..... | I, 1008; II, 2594 |
| Harbor lines, establishment..... | I, 1841 |
| Harbors and rivers. <i>See</i> Rivers and harbors. | |
| Harlem (Bronx) Kills, N. Y.: | |
| Examination and survey..... | I, 268 |
| Improvement..... | I, 228; II, 2074 |
| Harlem River, N. Y., improvement..... | I, 228; II, 2074 |
| Harris County, Houston ship channel navigation district, contribution of funds for Galveston-Houston Channel, Tex..... | I, 963; II, 2575 |
| Hat Slough, Puget Sound, Wash., construction of dike at..... | I, 1759; II, 8356 |
| Havre de Grace, Md.: | |
| Examination and survey of harbor at..... | I, 481 |
| Improvement of Susquehanna River at..... | I, 488; II, 2207 |
| Hawaiian Islands: | |
| Defenses..... | I, 20 |
| Hilo Harbor, improvement..... | I, 1798; II, 3385 |
| Honolulu Harbor, improvement..... | I, 1792; II, 3381 |
| Kahului Harbor, improvement..... | I, 1795; II, 3383 |
| Sea walls..... | I, 23 |
| Hawaii engineering district..... | I, 1792; II, 3381 |
| Hay Lake Channel, St. Marys River, Mich.: | |
| Improvement..... | I, 1477; II, 3153 |
| Improvement of channels in waters connecting Great Lakes..... | I, 1477; II, 3153 |
| Hell Gate, East River, N. Y., improvement..... | I, 220; II, 2069 |
| Hempstead Harbor (north shore of Long Island), N. Y.: | |
| Examinations and surveys..... | I, 810 |
| Improvement..... | I, 289; II, 2109 |
| Hennepin Canal (Illinois & Mississippi Canal), Ill.: | |
| Improvement..... | I, 1133; II, 2728 |
| Operating and care..... | I, 1184; II, 2729 |
| Hereford Inlet, N. J., examination and survey..... | I, 433 |
| Highway bridges, Potomac River, Washington, D. C.: | |
| Aqueduct Bridge, repairs..... | I, 1866 |
| Highway Bridge, repairs..... | I, 1884; III, 3722 |
| Key Bridge, construction..... | I, 1872 |
| Highways. <i>See</i> Roads. | |
| Hillsboro Bay and River, Fla.: | |
| Improvement of bay..... | I, 761; II, 2418 |
| Improvement of river..... | I, 766; II, 2421 |
| Hilo Harbor, Hawaii, improvement..... | I, 1798; II, 3385 |
| Hivassee River, Tenn., improvement..... | I, 1242; II, 2832 |
| Holland Harbor, Mich., improvement..... | I, 1441; II, 3116 |
| Holmes River, Fla., improvement..... | I, 807; II, 2451 |
| Honolulu, Hawaii: | |
| Defenses..... | I, 20 |
| Engineer depot..... | I, 35 |
| Engineering district..... | I, 1792; II, 3381 |
| Improvement of harbor..... | I, 1792; II, 3381 |
| Hoquarten Slough, Tillamook Bay, Oreg.: | |
| Examination and survey..... | I, 1715 |
| Improvement..... | I, 1686; II, 3310 |
| Hoquiam River, Wash., improvement..... | I, 1756; II, 3356 |
| Horn Island Harbor and Pass, Miss., improvement..... | I, 852; II, 2493 |
| Horseshoe Battle Ground, Ala., monument at..... | I, 1964 |
| Hospital Point, Norfolk Harbor, Va., removal..... | I, 508; II, 2253 |
| Housatonic River, Conn., improvement..... | I, 180; II, 2050 |
| Houston to Galveston ship channel, Tex.: | |
| Examination and survey..... | I, 1013 |
| Improvement..... | I, 961; II, 2575 |
| Howard University Reservoir, Washington Aqueduct, D. C..... | I, 1876; III, 3681 |

| | Page. |
|---|--------------------|
| Hudson River, N. Y.: | |
| Examinations and surveys | I, 268 |
| Improvement above New York | I, 237; II, 2080 |
| Improvement at New York | I, 232; II, 2077 |
| Peekskill Harbor, improvement | I, 247; II, 2087 |
| Rondout Harbor, improvement | I, 253; II, 2091 |
| Saugerties Harbor, improvement | I, 251; II, 2090 |
| Tarrytown Harbor, improvement | I, 244; II, 2088 |
| Troy lock and dam, operating and care | I, 244; II, 2085 |
| Humboldt Bay and Harbor, Cal.: | |
| Examinations and surveys | I, 1641 |
| Improvement | I, 1634; II, 3278 |
| Huntington Harbor, N. Y., improvement | I, 292; II, 2110 |
| Huron Harbor, Ohio, improvement | I, 1531; II, 3210 |
| Huron Lake: | |
| Channels in waters connecting Great Lakes, improvement | I, 1477; II, 3153 |
| Examination of harbors and connecting waters of Great Lakes | I, 1597 |
| Surveys, charts, etc. | I, 1916; III, 3731 |
| Water levels | I, 1926; III, 3740 |
| Hutchinson River (East Chester Creek), N. Y., improvement | I, 211; II, 2065 |
| Hyacinths, water, removal: | |
| From Alabama, Mississippi, Louisiana, and Texas, waters | I, 945; II, 2563 |
| From Florida waters | I, 775; II, 2426 |
| Hydraulic mining in California | I, 1806; II, 3396 |
| Hydraulics. <i>See</i> Water levels. | |
| Hydrology. <i>See</i> Water levels. | |

I.

| | |
|--|-------------------|
| Illinois & Mississippi Canal, Ill.: | |
| Improvement | I, 1133; II, 2728 |
| Operating and care | I, 1134; II, 2729 |
| Illinois River, Ill.: | |
| Improvement | I, 1423; II, 3100 |
| Operating and care of locks and dams | I, 1423; II, 3104 |
| Operating snag boats and dredge boats | I, 1131; II, 2726 |
| Indiana Harbor, Ind., improvement | I, 1416; II, 3094 |
| Indian Bayou, Miss., examination and survey | I, 1068 |
| Indian River, Fla., improvement | I, 717; II, 2394 |
| Indian River Inlet, N. J., examination and survey | I, 433 |
| Inland waterways. <i>See</i> Canals and Waterways. | |
| Inside routes. <i>See</i> Canals and Waterways. | |
| Insular possessions: | |
| Defenses | I, 20 |
| Honolulu, Hawaii, engineering district | I, 1792; II, 3331 |
| Porto Rico engineering district | I, 1800; II, 3339 |
| International Association of Congresses of Navigation | I, 1823 |
| Intracoastal waterways. <i>See</i> Canals and Waterways. | |
| Island End River, Mass., examination and survey | I, 118 |
| Isthmian Canal, fortification | I, 27 |
| Istokpoga Creek, Fla., improvement of Kissimmee River | I, 730; II, 2402 |

J.

| | |
|--|-------------------|
| Jackson, Gen. Andrew, monument at Horseshoe Battleground | I, 1964 |
| Jackson River, Fla., improvement of waterway via | I, 798; II, 2443 |
| Jacksonville, Fla.: | |
| Engineering district | I, 698; II, 2281 |
| Improvement of St. Johns River opposite | I, 703; II, 2286 |
| Jacksonville, N. C., improvement of waterway to Beaufort | I, 584; II, 2308 |
| Jamaica Bay, N. Y., improvement | I, 301; II, 2113 |
| James River, Va., improvement | I, 517; II, 2238 |
| Jefferson-Shreveport Waterway, La. and Tex., improvement | I, 1041; II, 2630 |
| Jekyl Creek, Ga., improvement of waterway via | I, 664; II, 2367 |
| Johnsons Bayou, La., improvement | I, 1025; II, 2607 |
| Johnsons Creek, or River, Conn., improvement | I, 183; II, 2051 |
| Johns Pass, Fla., examination and survey of waterway via | I, 778 |

| | |
|--|------------------|
| Jones Inlet, N. Y., examination and survey of shore front to Rockaway Inlet..... | I, 810 |
| Jordan River, Miss.: | |
| Examination and survey..... | I, 876 |
| Improvement..... | I, 868; II, 2501 |
| Judith Point, R. I.: | |
| Construction of harbor of refuge..... | I, 140; II, 2083 |
| Examination of harbor of refuge..... | I, 149 |
| Improvement of Pond entrance..... | I, 142; II, 2084 |

K.

| | |
|---|-----------------------------|
| Kahului Harbor, Hawaii, improvement..... | I, 1795; II, 8888 |
| Kalamazoo River, Mich.: | |
| Examination and survey..... | I, 1476 |
| Improvement..... | I, 1488; II, 8114 |
| Kampsville Lock and Dam, Illinois River, Ill., operating and care..... | I, 1428; II, 8104 |
| Kanawha River and its tributaries, W. Va., examination for flood control..... | I, 1827 |
| Kanawha River, W. Va., operating and care of locks and dams..... | I, 1284; II, 2964 |
| Kankakee River and its tributaries, Ill. and Ind., examination for flood control..... | I, 1827 |
| Kansas City, Mo., engineering district..... | I, 1167; II, 2745 |
| Kansas River, Kans., improvement..... | I, 1185; II, 2774 |
| Kansas, State of, examination for flood control in..... | I, 1121 |
| Kelso Bayou, La., examination and survey..... | I, 949 |
| Kennebec River, Me.: | |
| Defenses..... | I, 8 |
| Examination of channel west of Swan Island..... | I, 67 |
| Examination of Parker Head Harbor and Channel..... | I, 67 |
| Improvement..... | I, 59; II, 1980 |
| Kenosha Harbor, Wis., improvement..... | I, 1898; II, 8076 |
| Kentucky River, Ky.: | |
| Improvement..... | I, 1810; II, 8017 |
| Operating and care of locks and dams..... | I, 1318; II, 3020 |
| Keokuk (Des Moines Rapids) Canal and Dry Dock, Mississippi River, operating and care..... | I, 1128; II, 2723 |
| Kewaunee Harbor, Wis., improvement..... | I, 1372; II, 3062 |
| Keweenaw Canal, across Keweenaw Point, Mich. (Keweenaw Bay-Lake Superior waterway): | |
| Improvement..... | I, 1388; II, 3088 |
| Operating and care..... | I, 1346; II, 3045 |
| Key Bridge, Potomac River at Georgetown, D. C., construction..... | I, 1872 |
| Key, Francis Scott, monument..... | I, 1905 |
| Keyport Harbor, N. J., improvement..... | I, 339; II, 2138 |
| Keystone Lock, Bayou Teche, La., operating and care..... | I, 917; II, 2546 |
| Key West Harbor, Fla.: | |
| Defenses..... | I, 8 |
| Examination and survey..... | I, 779 |
| Examination and survey of Northwest Channel..... | I, 779 |
| Improvement..... | I, 726; II, 2400 |
| Kiamichi River, Okla., improvement..... | I, 1036; II, 2618 |
| Kill Van Kull, N. Y. and N. J., improvement of Staten Island-New Jersey Channels..... | I, 819, 828; II, 2127, 2130 |
| King County, Wash., improvement of Lake Washington Canal by..... | I, 1768; II, 8364 |
| Kings Creek, Camden County, Ga., examination and survey..... | I, 698 |
| Kingsley Cut, Fla., improvement of waterway via..... | I, 667; II, 2368 |
| Kinnikinnick River, Wis., improvement of Milwaukee Harbor..... | I, 1885; II, 3071 |
| Kissimmee River, Fla., improvement..... | I, 730; II, 2402 |

L.

| | |
|--|-------------------|
| La Conner, Wash., improvement of Swinomish Slough..... | I, 1777; II, 8874 |
| Lafourche Bayou, La.: | |
| Examinations and surveys..... | I, 949 |
| Improvement..... | I, 901; II, 2584 |

| | Page. |
|---|--------------------|
| Lagrange Lock and Dam, Illinois River, Ill., operating and care..... | i, 1428; ii, 3104 |
| Lake Champlain, improvement of narrows..... | i, 256; ii, 2002 |
| Lake Erie near Toledo, Ohio, waterway to Lake Michigan, examination and survey..... | i, 1557 |
| Lake of the Woods, Minn., improvement of Zippel Bay..... | i, 1163; ii, 2744 |
| Lake Pontchartrain, La., improvement..... | i, 888; ii, 2527 |
| Lake River, Wash., examination and survey..... | i, 1746 |
| Lakes, Great: | |
| Channels in waters connecting, improvement..... | i, 1477; ii, 3153 |
| Commercial statistics, Sault Ste. Marie Canals, Mich..... | i, 1497; ii, 3171 |
| Control and regulation of waters of Niagara River, and preservation of Niagara Falls..... | i, 1982 |
| Examination of harbors and connecting waters of..... | i, 1597 |
| Surveys, charts, etc..... | i, 1916; iii, 3731 |
| Water levels..... | i, 1926; iii, 3740 |
| Lake survey..... | i, 1916; iii, 3731 |
| Lake Traverse, Minn. and S. Dak.: | |
| Examination and survey..... | i, 1106 |
| Improvement..... | i, 1157; ii, 2742 |
| Lake Washington Canal, Wash.: | |
| Improvement of waterway to Puget Sound..... | i, 1768; ii, 3364 |
| Operating and care of waterway to Puget Sound..... | i, 1785; ii, 3377 |
| Lake Washington, Miss., improvement..... | i, 1083; ii, 2650 |
| Lamberts Point, Norfolk Harbor, Va., improvement of anchorage at..... | i, 508; ii, 2253 |
| L'Anguille River, Ark., improvement..... | i, 1105; ii, 2671 |
| La Trappe River, Md., improvement..... | i, 454; ii, 2216 |
| Lavaca Bay, Tex., improvement of channel from Pass Cavallo to Port Lavaca..... | i, 995; ii, 2580 |
| Laws of Sixty-fourth Congress, second session, affecting Corps of Engineers..... | iii, 3761 |
| Leaf River, Miss.: | |
| Improvement..... | i, 800; ii, 2497 |
| Reexamination..... | i, 876 |
| Leavenworth, Fort, Kans.: | |
| Engineer depot..... | i, 34 |
| Purchase of lithograph press for Army Service Schools..... | i, 43 |
| Leech Lake Reservoir, Minn.: | |
| Construction..... | i, 1146; ii, 2737 |
| Operating and care..... | i, 1151; ii, 2739 |
| Leech River, Minn., improvement, including upper Mississippi River..... | i, 1143; ii, 2736 |
| Lee Slough, Apalachicola River, Fla.: | |
| Improvement..... | i, 785; ii, 2432 |
| Reexamination..... | i, 831 |
| Leipsic River, Del., improvement..... | i, 413; ii, 2187 |
| Lemon Creek, N. Y., examination and survey..... | i, 340 |
| Les Cheneaux Channels, Mich., examination and survey..... | i, 1321 |
| Levels, water. See Water levels. | |
| Levisa Fork, Big Sandy River, Ky.: | |
| Improvement..... | i, 1905; ii, 3011 |
| Operating and care of locks and dams..... | i, 1909; ii, 3014 |
| Lewes, Del., pier in Delaware Bay near..... | i, 371; ii, 2164 |
| Lewis River, Wash., improvement..... | i, 1735; ii, 3345 |
| Liberty Bay, Wash., examination..... | i, 1791 |
| Licking River, Ky., examination and survey..... | i, 1291 |
| Lighthouses, establishment of, officers on duty in connection with..... | i, 4 |
| Little Annemessex River, Md., improvement of Orisfield Harbor..... | i, 474; ii, 2226 |
| Little Calumet River, Ill. and Ind., improvement..... | i, 1412; ii, 3062 |
| Little Elk River, Md., improvement..... | i, 440; ii, 2206 |
| Little Kanawha River, W. Va., operating and care of locks and dams..... | i, 1282; ii, 2950 |
| Little Mud River, Ga., improvement of waterway via..... | i, 664; ii, 2307 |
| Little Narragansett Bay, R. I. and Conn., improvement..... | i, 150; ii, 2057 |
| Little Peedee River, S. C., improvement..... | i, 623; ii, 2342 |
| Little Pigeon River, Tenn., improvement..... | i, 1236; ii, 2330 |

| | Page. |
|---|-------------------|
| Little Red River, Ark., improvement..... | I, 1094; II, 2864 |
| Little River, Del., improvement..... | I, 415; II, 2189 |
| Little River, S. C., examination and survey..... | I, 647 |
| Little Rock, Ark., engineering district..... | I, 1088; II, 2853 |
| Little Sarasota Bay, Fla., improvement..... | I, 742; II, 2408 |
| Little Sodus Bay, N. Y., improvement of harbor..... | I, 1586; II, 3251 |
| Little Wicomico River, Va., examination and survey..... | I, 507 |
| Live Oak and Caney Creeks, Tex., examination and survey..... | I, 1012 |
| Livingstone Channel, Detroit River, Mich.: | |
| Examination and survey..... | I, 1521 |
| Improvement..... | I, 1492; II, 3161 |
| Log booms, permits for construction..... | I, 1839 |
| Long Island Sound, N. Y. and Conn.: | |
| Defenses of eastern entrance..... | I, 8 |
| Examination and survey of south coast..... | I, 310 |
| Lorain Harbor, Ohio, improvement..... | I, 1537; II, 3213 |
| Los Angeles, Cal.: | |
| Defenses..... | I, 8 |
| Engineering district..... | I, 1597; II, 3261 |
| Improvement of harbor..... | I, 1603; II, 3263 |
| Louisiana, Mo., improvement of Mississippi River at, raising Government dike..... | I, 1127; II, 2721 |
| Louisiana, State of, removal of water hyacinths from..... | I, 945; II, 2563 |
| Louisville & Portland Canal, Ky.: | |
| Enlargement..... | I, 1244; II, 2877 |
| Operating and care..... | I, 1259; II, 2921 |
| Louisville, Ky., engineering district..... | I, 1292; II, 2987 |
| Lower Cedar Point, Md., improvement of Potomac River at..... | I, 489; II, 2239 |
| Lower Chipola River, Fla.: | |
| Improvement..... | I, 785; II, 2432 |
| Reexamination..... | I, 831 |
| Lower Duwamish River, Wash., examination and survey..... | I, 1790 |
| Lower Thoroughfare, Wenona, Deal Island, Md., improvement..... | I, 473; II, 2227 |
| Ludington Harbor, Mich., improvement..... | I, 1454; II, 3131 |
| Lynn Harbor, Mass., improvement..... | I, 94; II, 2003 |

M.

| | |
|--|--------------------|
| McClellanville, S. C., improvement of water to Charleston..... | I, 638; II, 2351 |
| Macdonough Memorials, Lake Champlain, N. Y. and Vt..... | I, 1960 |
| Machias River, Me., examination and survey..... | I, 67 |
| Mackinac Harbor, Mich.: | |
| Examination and survey..... | I, 1521 |
| Improvement..... | I, 1499; II, 3192 |
| McMillan Park Reservoir..... | I, 1876; III, 3692 |
| Maçon Bayou, La., improvement..... | I, 1058; II, 3692 |
| Maine, wreck of battleship, removal from Habana Harbor..... | I, 1824 |
| Main ship channel, New York Harbor, N. Y., improvement..... | I, 269; II, 2097 |
| Malden River, Mass., improvement..... | I, 101; II, 2008 |
| Mamaroneck Harbor, N. Y.: | |
| Examination and survey..... | I, 268 |
| Improvement..... | I, 205; II, 2063 |
| Manatee River, Fla.: | |
| Examination and survey..... | I, 778 |
| Improvement..... | I, 768; II, 2422 |
| Manchac Bayou, La., improvement..... | I, 897; II, 2533 |
| Manchac Pass, La.: | |
| Improvement..... | I, 892; II, 2530 |
| Reexamination..... | I, 948 |
| Manila, P. I.: | |
| Defenses of bay..... | I, 20 |
| Engineer depot..... | I, 35 |
| Manistee Harbor and River, Mich., improvement..... | I, 1458; II, 3135 |
| Manistique Harbor, Mich., improvement..... | I, 1348; II, 3049 |
| Manitowoc Harbor, Wis., improvement..... | I, 1377; II, 3066 |
| Manokin River, Md., improvement..... | I, 471; II, 2226 |

| | Page. |
|---|--------------------|
| Manteo Bay, N. C., improvement..... | I, 552; II, 2277 |
| Mantua Creek, N. J., improvement..... | I, 390; II, 2169 |
| Maps and charts: | |
| Collection of data for..... | I, 30 |
| Military surveys and..... | I, 30 |
| Northern and northwestern lakes..... | I, 1916; III, 3731 |
| War Department maps..... | I, 30 |
| Marcus Hook, Pa., improvement of ice harbor at..... | I, 370; II, 2164 |
| Mare Island Strait, Cal., improvement..... | I, 1626; II, 3274 |
| Marmotte Bayou, Ala., examination and survey..... | I, 876 |
| Marquette Bay and Harbor, Mich.: | |
| Construction of harbor of refuge in bay..... | I, 1338; II, 3040 |
| Improvement of harbor..... | I, 1340; II, 3041 |
| Marshyhope Creek, Md., improvement..... | I, 463; II, 2222 |
| Matagorda Bay, Tex.: | |
| Improvement of channel from Pass Cavallo to Aransas Pass..... | I, 997; II, 2589 |
| Improvement of channel to Brazos River..... | I, 991; II, 2587 |
| Matawan Creek, N. J.: | |
| Improvement..... | I, 341; II, 2139 |
| Improvement of Keyport Harbor..... | I, 339; II, 2138 |
| Mattaponi River, Va.: | |
| Examination and survey..... | I, 507 |
| Improvement..... | I, 502; II, 2246 |
| Mattituck Harbor, N. Y., improvement..... | I, 296; II, 2112 |
| Maumee Bay and River, Ohio: | |
| Examination of river and its tributaries in Ohio and Indiana for flood control..... | I, 1827 |
| Improvement of Toledo Harbor..... | I, 1522; II, 3206 |
| Maurice River, N. J., improvement..... | I, 392; II, 2174 |
| Meherrin River, N. C., improvement..... | I, 544; II, 2271 |
| Memorial statues, etc. See Statues, memorials, etc. | |
| Memphis Harbor, Tenn., improvement by Mississippi River Commission..... | I, 1821; III, 3411 |
| Menominee Harbor and River, Mich., and Wis., improvement..... | I, 1351; II, 3061 |
| Menomonee River, Wis., improvement of Milwaukee inner harbor..... | I, 1385; II, 3071 |
| Mermentau River, La.: | |
| Examination and survey..... | I, 948 |
| Improvement, including tributaries..... | I, 932; II, 2556 |
| Improvement of waterway to Franklin..... | I, 921; II, 2549 |
| Improvement of waterway to Sabine River..... | I, 924; II, 2551 |
| Operating and care of Schooner Bayou Lock..... | I, 929; II, 2553 |
| Merrimack River, Mass.: | |
| Examinations and survey..... | I, 118 |
| Improvement..... | I, 71; II, 1986 |
| Improvement of Newburyport Harbor..... | I, 68; II, 1985 |
| Meters, water, installation in certain Government buildings..... | I, 1876; III, 3681 |
| Miakka River, Fla.: | |
| Examination and survey..... | I, 778 |
| Examination and survey of waterway to Sarasota Bay..... | I, 779 |
| Miami Harbor, Fla., improvement..... | I, 722; II, 2398 |
| Miami River and its tributaries, Ohio, examination for flood control..... | I, 1827 |
| Michigan City Harbor, Ind., improvement..... | I, 1419; II, 3067 |
| Michigan, Lake: | |
| Canal to Sturgeon Bay— | |
| Improvement..... | I, 1366; II, 3059 |
| Operating and care..... | I, 1400; II, 3061 |
| Channels in waters connecting Great Lakes, improvement..... | I, 1477; II, 3153 |
| Examination of harbors and connecting waters of Great Lakes..... | I, 1597 |
| Illinois and Mississippi Canal— | |
| Improvement..... | I, 1133; II, 2728 |
| Operating and care..... | I, 1134; II, 2729 |
| Surveys, charts, etc..... | I, 1916; III, 3731 |
| Water levels..... | I, 1926; III, 3740 |
| Waterway to Lake Erie, examination..... | I, 1597 |

| | Page. |
|--|--------------------|
| Middle Neebish Channel, St. Marys River, Mich., improvement..... | i, 1477; ii, 3153 |
| Milford Harbor, Conn., improvement..... | i, 178; ii, 2049 |
| Milford Haven Harbor, Va., improvement..... | i, 500; ii, 2245 |
| Military maps and surveys..... | i, 30 |
| Military railways..... | i, 39 |
| Military structures, Philippine Islands..... | i, 26 |
| Militia, equipment of Coast Artillery armories..... | i, 20 |
| Mill Creek, or River, Conn.: | |
| Improvement of New Haven Harbor..... | i, 172; ii, 2047 |
| Improvement of Southport Harbor..... | i, 187; ii, 2053 |
| Improvement of Stamford Harbor..... | i, 195; ii, 2057 |
| Milwaukee, Wis.: | |
| Engineering district..... | i, 1847; ii, 3049 |
| Examination and survey..... | i, 1401 |
| Improvement of inner and outer harbors..... | i, 1885; ii, 3071 |
| Mines, submarine..... | i, 17 |
| Minim Creek-Estherville Canal, S. C., improvement..... | i, 629; ii, 2345 |
| Mining casemates..... | i, 17 |
| Mining, hydraulic, in California..... | i, 1806; ii, 3398 |
| Minnesota River, Minn.: | |
| Improvement..... | i, 1155; ii, 2741 |
| Operating snag and dredge boats..... | i, 1131; ii, 2728 |
| Miscellaneous civil works, estimates for..... | i, 1849 |
| Misspillion River, Del., improvement..... | i, 421; ii, 2192 |
| Mississippi River: | |
| Electrical-power development between St. Paul and Minneapolis..... | i, 1137; ii, 2733 |
| Examinations and surveys— | |
| Head of Passes to headwaters (Mississippi River Commission)..... | i, 1821 |
| Near Deer River..... | i, 1166 |
| St. Paul Harbor, Minn..... | i, 1167 |
| South Pass..... | i, 885; ii, 2524 |
| Gaging, including tributaries, at or near St. Paul, Minn..... | i, 1152; ii, 2740 |
| Improvement above Minneapolis— | |
| Brainerd to Grand Rapids..... | i, 1141; ii, 2735 |
| Leech and Mississippi Rivers..... | i, 1143; ii, 2736 |
| Reservoir dams at headwaters..... | i, 1146; ii, 2737 |
| St. Paul to Minneapolis..... | i, 1137; ii, 2733 |
| Improvement at Louisiana, Mo., raising Government dike..... | i, 1127; ii, 2721 |
| Improvement from Minneapolis to Missouri River— | |
| Illinois and Mississippi Canal..... | i, 1133; ii, 2728 |
| Missouri River to Minneapolis..... | i, 1122; ii, 2699 |
| Improvement from Missouri River to Ohio River..... | i, 1115; ii, 2677 |
| Improvement from Ohio River to Head of Passes— | |
| Cubits Gap to Head of Passes..... | i, 877; ii, 2505 |
| Head of Passes to Ohio River (Mississippi River Commission)..... | i, 1821; iii, 3411 |
| Improvement of Memphis Harbor, Miss. (Mississippi River Commission)..... | i, 1821; iii, 3411 |
| Improvement of Passes of Mississippi River— | |
| South Pass..... | i, 882; ii, 2518 |
| Southwest Pass, including shoals between Cubits Gap and Head of passes, and dredge construction..... | i, 877; ii, 2505 |
| Improvement of waterway to Sabine River..... | i, 921; ii, 2549 |
| Levees, Head of Passes to Cape Girardeau, Mo..... | i, 1821; iii, 3411 |
| New Orleans, La., defenses..... | i, 8 |
| Operating and care— | |
| Illinois and Mississippi Canal..... | i, 1134; ii, 2729 |
| Keokuk (Des Moines Rapids) Canal and Dry Dock..... | i, 1128; ii, 2723 |
| Moline, Ill., lock at..... | i, 1130; ii, 2725 |
| Reservoir dams at headwaters..... | i, 1151; ii, 2739 |
| Snag and dredge boats above Missouri River..... | i, 1131; ii, 2726 |
| Snag boats below Missouri River..... | i, 1119; ii, 2694 |
| Twin City Lock and Dam..... | i, 1151; ii, 2738 |
| Towboats, experimental, for use on..... | i, 1825; ii, 3405 |

| | Page. |
|---|--|
| Mississippi River Commission: | |
| Flood protection by..... | i, 1821; iii, 3411 |
| Improvement of Mississippi River by..... | i, 1821; iii, 3411 |
| Mississippi Sound, Miss. and Ala.: | |
| Gulfport-Ship Island Channel and Ship Island Pass, improve-
ment..... | i, 855; ii, 2495 |
| Horn Island Harbor, improvement..... | i, 852; ii, 2498 |
| Horn Island Pass, Miss., improvement..... | i, 852; ii, 2498 |
| Improvement of channel to Mobile Bay..... | i, 837; ii, 2478 |
| Mississippi State, removal of water hyacinths from..... | i, 945; ii, 2563 |
| Missouri River: | |
| Contributions from private agencies for improvement..... | i, 1172, 1177, 1183;
ii, 2761, 2770, 2772 |
| Florence to Decatur, Nebr., examination and survey..... | i, 1197 |
| General..... | i, 1167; ii, 2745 |
| Kansas City to mouth, improvement..... | i, 1168; ii, 2745 |
| Kansas City to Sioux City, improvement..... | i, 1175; ii, 2767 |
| Sioux City to Fort Benton, improvement..... | i, 1181; ii, 2771 |
| Mobile, Ala., engineering district..... | i, 832; ii, 2473 |
| Mobile Bay and Harbor, Ala.: | • |
| Defenses..... | i, 8 |
| Examination and survey of harbor and bar..... | i, 876 |
| Examination and survey of waterway to Pensacola Bay, Fla..... | i, 831 |
| Improvement of channel to Mississippi Sound..... | i, 837; ii, 2478 |
| Improvement of harbor and bar..... | i, 832; ii, 2473 |
| Mokelumne River, Cal., improvement..... | i, 1654; ii, 3288 |
| Moline Harbor, Ill.: | |
| Improvement of Mississippi River between Missouri River and Minne-
apolis, Minn..... | i, 1122; ii, 2699 |
| Operating and care of lock..... | i, 1130; ii, 2725 |
| Monongahela River, W. Va. and Pa.: | |
| Improvement..... | i, 1261; ii, 2931 |
| Improvement of Pittsburgh Harbor..... | i, 1276; ii, 2955 |
| Operating and care of locks and dams..... | i, 1267; ii, 2934 |
| Monroe Harbor, Mich., improvement..... | i, 1518; ii, 3208 |
| Monroe Lake, St. Johns River, Fla., improvement..... | i, 707; ii, 2389 |
| Monterey Harbor, Cal., improvement..... | i, 1633; ii, 3277 |
| Montesano, Wash., improvement of Chehalis River at..... | i, 1754; ii, 3355 |
| Montgomery, Ala.: | |
| Engineering district..... | i, 780; ii, 2427 |
| Erection of monument in Montgomery district..... | i, 1964 |
| Monuments, statues, etc. <i>See</i> Statues, memorials, etc. | |
| Morehead City Harbor, N. C., improvement..... | i, 591; ii, 2308 |
| Mormon Channel, San Joaquin River, Cal., improvement..... | i, 1651; ii, 3283 |
| Morris Cove, New Haven Harbor, Conn., improvement..... | i, 172; ii, 2047 |
| Mortar batteries..... | i, 10, 20 |
| Mount Desert, Bar Harbor, Me., construction of breakwater..... | i, 50; ii, 1976 |
| Mud Lake, Mermentau River, La., improvement..... | i, 932; ii, 2556 |
| Mud River, Ga., improvement of waterway via..... | i, 664; ii, 2367 |
| Mud River, S. C., improvement of waterway via..... | i, 662; ii, 2366 |
| Mulberry Fork of Warrior River, examination and survey..... | i, 876 |
| Murderkill River, Del., improvement..... | i, 419; ii, 2191 |
| Muscle Shoals Canal, Tennessee River, Ala., operating and care..... | i, 1233; ii, 2825 |
| Muskegon Harbor and River, Mich.: | |
| Examination and survey of river..... | i, 1476 |
| Improvement..... | i, 1449; ii, 3126 |
| Muskingum River, Ohio: | |
| Examination of the river and tributaries for flood control..... | i, 1827 |
| Operating and care of locks and dams..... | i, 1303; ii, 3008 |
| Mystic River, Conn., improvement..... | i, 155; ii, 2039 |
| Mystic River, Mass.: | |
| Examinations and surveys..... | i, 118 |
| Improvement..... | i, 97; ii, 2004 |

N.

| | Page. |
|--|--------------------------------|
| Nansemond River, Va., improvement..... | I, 527; II, 2262 |
| Nanticoke River, Del. and Md., improvement..... | I, 463; II, 2222 |
| Nantucket Harbor, Mass., construction of harbor of refuge..... | I, 121; II, 2020 |
| Nantucket Sound, Mass., improvement of Pollock Rip Channel..... | I, 119; II, 2019 |
| Napa River, Cal., improvement..... | I, 1628; II, 3275 |
| Narragansett Bay, R. I.: | |
| Defenses..... | I, 8 |
| Improvement..... | I, 133; II, 2028 |
| Narrows of Lake Champlain, N. Y. and Vt., improvement..... | I, 256; II, 2092 |
| Nasel River, Wash., improvement..... | I, 1748; II, 3353 |
| Nashville, Tenn., engineering district..... | I, 1197; II, 2785 |
| Nassau Sound, improvement of waterway via..... | I, 667; II, 2368 |
| Natalbany River, La., improvement..... | I, 894; II, 2531 |
| National Coast Defense Board..... | I, 8 |
| National Parks. <i>See</i> Parks. | |
| Naugatuck River, Conn., examination and survey..... | I, 201 |
| Navesink (North Branch of Shrewsbury) River, N. J., improve-
ment..... | I, 345; II, 2142 |
| Navigable waters. <i>See</i> Bridges, Rivers and harbors, <i>and</i> Wrecks. | |
| Navigation, Congresses of, Permanent International Association..... | I, 1823 |
| Neches River, Tex.: | |
| Examination and survey of cut-offs at Harbor Island..... | I, 1046 |
| Examination and survey of Neches-Sabine Canal..... | I, 1046 |
| Improvement of Neches-Sabine Canal..... | I, 1018; II, 2802 |
| Neebish Channels, St. Marys River, Mich., improvement..... | I, 1477; II, 3153 |
| Nehalem Bar and Bay, Oreg.: | |
| Examination of bay and river from bay entrance to town of Ne-
halem..... | I, 1715 |
| Improvement..... | I, 1692; II, 3314 |
| Nemadji River, Wis., improvement of Duluth-Superior Harbor..... | I, 1819; II, 3030 |
| Neosho River, Kans., examination for flood control..... | I, 1121 |
| Neponset River, Mass., improvement..... | I, 106; II, 2009 |
| Neuse River, N. C., improvement..... | I, 564; II, 2287 |
| Newark Bay, N. Y. and N. J.: | |
| Examination and survey..... | I, 350 |
| Improvement..... | I, 311; II, 2119 |
| New Bedford Harbor, Mass.: | |
| Defenses..... | I, 8 |
| Improvement..... | I, 123; II, 2022 |
| Newburyport Harbor, Mass., improvement..... | I, 66; II, 1985 |
| New Haven Harbor, Conn.: | |
| Construction of breakwaters..... | I, 176; II, 2049 |
| Examination and survey..... | I, 201 |
| Improvement, by dredging, etc..... | I, 172; II, 2047 |
| New Jersey and New York Channels, examination and survey..... | I, 350 |
| New Jersey coast waterway, Cape May to New York Bay, N. Y. and N. J.,
examination and survey..... | I, 433 |
| New Jersey-Staten Island Channels, N. Y. and N. J., improvement..... | I, 319,
323; II, 2127, 2130 |
| New London, Conn.: | |
| Engineering district..... | I, 150; II, 2087 |
| Improvement of harbor..... | I, 157; II, 2039 |
| New Orleans, La.: | |
| Defenses..... | I, 8 |
| Engineering district..... | I, 877; II, 2505 |
| Newport Harbor, R. I., improvement..... | I, 181; II, 2027 |
| Newport News, Va., improvement of channels to..... | I, 514; II, 2257 |
| Newport, R. I., engineering district..... | I, 118; II, 2019 |
| Newport River, N. C., improvement of waterways between Beaufort and
New River..... | I, 586, 588; II, 2304, 2306 |

| | Page. |
|---|--------------------------------|
| New River, N. C.: | |
| Improvement..... | I, 584; II, 2808 |
| Improvement of waterways to Swansboro and Beaufort..... | I, 588,
588; II, 2804, 2806 |
| Reexamination..... | I, 615 |
| New Rochelle, N. Y.: | |
| Examination and survey of harbor..... | I, 288 |
| Improvement of Echo Bay Harbor..... | I, 208; II, 2064 |
| Newton Creek, N. J., examination and survey..... | I, 432 |
| Newtown Creek, N. Y., improvement..... | I, 284; II, 2107 |
| New Whatcom (Bellingham) Harbor, Wash., improvement of Whatcom
Creek waterway..... | I, 1779; II, 3375 |
| New York and New Jersey Channels, examination and survey..... | I, 350 |
| New York Bay and Harbor, N. Y.: | |
| Ambrose Channel, improvement..... | I, 289; II, 2097 |
| Arthur Kill, improvement..... | I, 319; II, 2127 |
| Battery, the, removal of shoal in Hudson River off Pier A..... | I, 282; II, 2077 |
| Bay Ridge Channel, improvement..... | I, 277; II, 2101 |
| Bayside Channel, improvement..... | I, 289; II, 2097 |
| Bronx River, improvement..... | I, 216; II, 2067 |
| Channel, Staten Island-Hoffman and Swinburne Islands..... | I, 289; II, 2097 |
| Coenties Reef, removal..... | I, 220; II, 2073 |
| Coney Island Channel, improvement..... | I, 275; II, 2101 |
| Craven Shoal, improvement..... | I, 289; II, 2097 |
| Defenses..... | I, 8 |
| Drift, collection and removal..... | I, 281; II, 2104 |
| East (Ambrose) Channel, improvement..... | I, 289; II, 2097 |
| East Chester Creek, improvement..... | I, 211; II, 2065 |
| East River, improvement, including Coenties Reef..... | I, 220; II, 2073 |
| Examinations and surveys..... | I, 268 |
| Flushing Bay, improvement..... | I, 287; II, 2108 |
| Gedney Channel, improvement..... | I, 289; II, 2097 |
| Gowanus Creek Channel, improvement..... | I, 279; II, 2108 |
| Harlem River, improvement..... | I, 228; II, 2074 |
| Hell Gate, East River, improvement..... | I, 220; II, 2069 |
| Hudson River Channel, improvement..... | I, 232; II, 2077 |
| Hutchinson River (East Chester Creek), improvement..... | I, 211; II, 2065 |
| Kill Van Kull, improvement..... | I, 319, 323; II, 2127, 2130 |
| Main Ship Channel, improvement..... | I, 289; II, 2097 |
| Narrows to the sea, improvement..... | I, 289; II, 2097 |
| New Jersey-Staten Island Channels, improvement..... | I, 319, 323; II, 2127, 2130 |
| Newtown Creek, N. Y., improvement..... | I, 284; II, 2107 |
| North (Hudson) River, improvement..... | I, 237; II, 2080 |
| Red Hook Channel, improvement..... | I, 277; II, 2101 |
| Shooters Island Channel, improvement..... | I, 323; II, 2130 |
| Spytten Duyvil Creek, improvement..... | I, 228; II, 2074 |
| Staten Island-New Jersey Channels, improvement..... | I, 319, 323;
II, 2127, 2130 |
| Staten Island Sound, improvement..... | I, 319; II, 2127 |
| Supervision..... | I, 1849; III, 3661 |
| Waterway to Cape May on coast of New Jersey, examination and
survey..... | I, 433 |
| New York engineering districts: | |
| First..... | I, 201; II, 2061 |
| Second..... | I, 289; II, 2097 |
| Third..... | I, 310; II, 2119 |
| Nezplique Bayou, La.: | |
| Examination and survey..... | I, 940 |
| Improvement..... | I, 932; II, 2556 |
| Niagara River, N. Y.: | |
| Black Rock Channel and Tonawanda Harbor, improvement..... | I, 1567;
II, 3235 |
| Buffalo Harbor, improvement..... | I, 1563; II, 3229 |
| Control and regulation of waters of, and preservation of the Falls..... | I, 1562 |
| Improvement..... | I, 1574; II, 3243 |
| Supervision of power companies at the Falls..... | I, 1562 |
| Surveys, etc..... | I, 1916; III, 3731 |

| | Page. |
|---|--------------------|
| Niantle Bay, Conn., examination and survey..... | i, 201 |
| Nome Harbor, Alaska, improvement..... | i, 1788; ii, 3380 |
| Nome Harbor and mouth of Snake River, Alaska, examination..... | i, 1791 |
| Norfolk Harbor, Va.: | |
| Defenses..... | i, 8 |
| General improvement, including main channel of Elizabeth River,
and portions of Southern, Eastern, and Western Branches..... | i, 508; ii, 2253 |
| Improvement of channels to Newport News..... | i, 514; ii, 2257 |
| Improvement of Thimble Shoal..... | i, 512; ii, 2256 |
| Improvement of waterway to Beaufort Inlet..... | i, 536; ii, 2266 |
| Improvement of waterway to sounds of North Carolina (to Pamlico
Sound) via Pasquotank River..... | i, 534; ii, 2265 |
| Operating and care of waterway to Beaufort Inlet, N. C..... | i, 541; ii, 2269 |
| Norfolk, Va., engineering district..... | i, 507; ii, 2253 |
| North Branch, Chicago River, Ill., improvement..... | i, 1406; ii, 3089 |
| North Branch, Shrewsbury River, N. J., improvement..... | i, 945; ii, 2142 |
| North Carolina Cut, N. C., improvement of waterway via..... | i, 536; ii, 2266 |
| North Carolina sounds, improvement of waterway to Norfolk, Va..... | i, 534; ii, 2265 |
| Northeast River, N. C., improvement..... | i, 607; ii, 2326 |
| Northern and northwestern lakes: | |
| Channels in waters connecting Great Lakes, improvement..... | i, 1477; ii, 3153 |
| Commercial statistics, Sault Ste. Marie Canals, Mich..... | i, 1497; ii, 3171 |
| Control and regulation of waters of Niagara River, and preservation
of Niagara Falls..... | i, 1932 |
| Surveys, charts, etc..... | i, 1916; iii, 3731 |
| Water levels..... | i, 1926; iii, 3740 |
| North Landing River, Va. and N. C., improvement of waterway via..... | i, 536 ii, 2266 |
| North River, N. C., improvement of waterway via..... | i, 536; ii, 2266 |
| North (Hudson) River, N. Y., improvement..... | i, 237; ii, 2080 |
| North River, Wash., improvement..... | i, 1748; ii, 3353 |
| Northwest Channel, Key West, Fla., examination and survey..... | i, 779 |
| Northwest Fork of Nanticoke River, Md., improvement..... | i, 463; ii, 2222 |
| Northwest River, Va. and N. C., examination and survey..... | i, 549 |
| Norwalk Harbor, Conn., improvement..... | i, 191; ii, 2055 |
| Norwich Harbor, Conn., improvement of Thames River..... | i, 159; ii, 2041 |
| O. | |
| Oak Bay to Port Townsend Bay, Wash., waterway, improvement..... | i, 1761; ii, 3357 |
| Oakland Harbor, Cal.: | |
| Examination..... | i, 1641 |
| Improvement..... | i, 1618; ii, 3269 |
| Obed River, Tenn., examination and survey..... | i, 1210 |
| Ocala, Fla., examinations and surveys of canal to Silver Springs..... | i, 778 |
| Occoquan Creek, Va., improvement..... | i, 491; ii, 2239 |
| Ocmulgee River, Ga., improvement..... | i, 688; ii, 2376 |
| Oconee River, Ga., improvement..... | i, 685; ii, 2375 |
| Oconto Harbor, Wis., improvement..... | i, 1354; ii, 3053 |
| Office of the Chief of Engineers, officers on duty in..... | i, 1965 |
| Ogdensburg Harbor, N. Y., improvement..... | i, 1594; ii, 3258 |
| Ohio River: | |
| Appropriations for locks and dams..... | i, 1258 |
| Estimate for improvement (locks and dams)..... | i, 1256 |
| Examination and survey at Uniontown, Ky..... | i, 1291 |
| Falls at Louisville, Ky., improvement at..... | i, 1244; ii, 2877 |
| General improvement (open-channel work)..... | i, 1288; ii, 2975 |
| Ice piers..... | i, 1288; ii, 2978 |
| Locks and dams, construction..... | i, 1244; ii, 2833 |
| Locks and dams, operating and care..... | i, 1259; ii, 2905 |
| Louisville & Portland Canal, Ky., enlargement..... | i, 1244; ii, 2877 |
| Louisville & Portland Canal, Ky., operating and care..... | i, 1259; ii, 2921 |
| Pittsburgh Harbor, Pa., improvement..... | i, 1276; ii, 2955 |
| Reexamination..... | i, 1280 |
| Snag boats, operation..... | i, 1290; ii, 2984 |
| Surveys..... | i, 1244; ii, 2833 |

| | Page |
|---|--------------------|
| Ohio River Valley Flood Board, examinations and surveys | I, 1827 |
| Oklawaha River, Fla., improvement | I, 712; II, 2392 |
| Olcott Harbor, N. Y., improvement | I, 1577; II, 3245 |
| Oldmans Creek, N. J., improvement | I, 384; II, 2171 |
| Old River, Wash., improvement | I, 1773; II, 3373 |
| Olympia Harbor, Wash.: | |
| Examination | I, 1791 |
| Improvement | I, 1762; II, 3358 |
| Onancock River, Va., improvement | I, 532; II, 2265 |
| One Mile Creek, Ala., examination and survey | I, 876 |
| Onosohatchee River, Fla., examination and survey | I, 778 |
| Ontario, Lake: | |
| Channels in waters connecting Great Lakes, improvement | I, 1477; II, 3153 |
| Examination of harbors and connecting waters of Great Lakes | I, 1597 |
| Surveys, charts, etc. | I, 1916; III, 3731 |
| Water levels | I, 1926; III, 3740 |
| Waterway to Lake Erie, examination | I, 1597 |
| Ontonagon Harbor and River, Mich., improvement | I, 1331; II, 3086 |
| Orange Mills Flats, St. Johns River, Fla., improvement | I, 705; II, 2387 |
| Orange River, Fla., improvement | I, 738; II, 2405 |
| Osage River, Mo.: | |
| Improvement | I, 1188; II, 2775 |
| Operating and care of lock and dam | I, 1194; II, 2782 |
| Oswego Harbor, N. Y.: | |
| Examination and survey | I, 1597 |
| Improvement | I, 1589; II, 3254 |
| Ouachita River, Ark. and La.: | |
| Improvement | I, 1052; II, 2627 |
| Operating and care of locks and dams | I, 1069; II, 2639 |
| Overpeck Creek, N. J., examination and survey | I, 350 |
| Oyster Creek, Tex., improvement | I, 986; II, 2586 |

P.

| | |
|---|--------------------|
| Pagan River, Va., improvement | I, 525; II, 2262 |
| Pamlico River, N. C.: | |
| Examination and survey | I, 616 |
| Improvement | I, 556; II, 2290 |
| Pamlico Sound, N. C.: | |
| Improvement of waterway to Beaufort Inlet | I, 576; II, 2296 |
| Improvement of waterway to Norfolk, Va. | I, 534; II, 2265 |
| Pamunkey River, Va., improvement | I, 504; II, 2249 |
| Panama Canal, fortification of | I, 27 |
| Parker Head Harbor and Channel, Me., examination and survey | I, 67 |
| Parks, public: | |
| Crater Lake National Park, Oreg., improvement | I, 1956; III, 3759 |
| District of Columbia, improvement and care | I, 1884; III, 3700 |
| Yellowstone National Park, improvement | I, 1940; III, 3745 |
| Pascagoula Harbor and River, Miss.: | |
| Improvement of harbor | I, 862; II, 2498 |
| Improvement of river above mouth of Dog River | I, 863; II, 2498 |
| Pasquotank River, N. C.: | |
| Examination and survey of Upper Pasquotank River | I, 549 |
| Improvement of waterway via | I, 534; II, 2265 |
| Passaic River, N. J., improvement | I, 311; II, 2119 |
| Pass Cavallo, Tex.: | |
| Improvement of channel to Aransas Pass | I, 997; II, 2589 |
| Improvement of channel to Port Lavaca | I, 995; II, 2589 |
| Passes of Mississippi River, improvement | I, 877; II, 2505 |
| Pass Manchac, La., improvement | I, 892; II, 2530 |
| Patapsco River, Md., improvement of Baltimore Harbor and Channels | I, 434; II, 2201 |
| Patchogue River, N. Y., improvement | I, 304; II, 2114 |
| Pawcatuck River, R. I. and Conn., improvement | I, 150; II, 2087 |
| Pawtucket (Seekonk) River, R. I., improvement | I, 137; II, 2081 |
| Peace River, Fla., improvement | I, 739; II, 2406 |
| Pearl Harbor, Hawaii, defenses | I, 20 |

| | Page. |
|--|--------------------|
| Pearl River, Miss.: | |
| Examination and survey | I, 876 |
| Improvement below Rockport | I, 872; II, 2503 |
| Improvement of East Pearl River | I, 870; II, 2502 |
| Reexamination below Rockport | I, 876 |
| Peedee Rivers, S. C.: | |
| Improvement of Great Peedee River | I, 625; II, 2343 |
| Improvement of Little Peedee River | I, 623; II, 2342 |
| Peekskill Harbor, N. Y., improvement | I, 247; II, 2067 |
| Penobscot River, Me., improvement | I, 53; II, 1978 |
| Pensacola Bay and Harbor, Fla.: | |
| Defenses | I, 8 |
| Examination and survey of waterway to Mobile Bay, Ala. | I, 831 |
| Improvement of harbor | I, 816; II, 2458 |
| Pentwater Harbor, Mich., improvement | I, 1472; II, 3150 |
| Pepperells Cove, Me., improvement | I, 66; II, 1962 |
| Pequonnock (Poquonock) River, Conn., improvement | I, 183; II, 2051 |
| Pere Marquette Lake, Ludington Harbor, Mich., improvement | I, 1454; II, 3131 |
| Permanent International Association of Congresses of Navigation | I, 1823 |
| Permits: | |
| For construction of bridges | I, 1830 |
| For diversion of water from Niagara River, N. Y., and for trans- | |
| mission of electrical power from Canada | I, 1982 |
| For erection in Porto Rico of structures other than bridges | I, 1848 |
| For private structures and operations in navigable waters | I, 1839 |
| Petaluma Creek, Cal.: | |
| Examination and survey | I, 1642 |
| Improvement | I, 1630; II, 3276 |
| Petersburg, Va., improvement of Appomattox River | I, 522; II, 2280 |
| Petoskey Harbor, Mich., improvement | I, 1470; II, 3148 |
| Philadelphia, Pa.: | |
| Engineering district | I, 350; II, 2145 |
| Erection of monuments in Philadelphia district | I, 1961 |
| Improvement of Delaware River at | I, 355; II, 2147 |
| Philippine Islands: | |
| Contingencies | I, 27 |
| Defenses | I, 20 |
| Military structures | I, 26 |
| Pierhead lines, establishment | I, 1841 |
| Pierre, Fort, S. Dak., improvement of Missouri River at | I, 1181; II, 2771 |
| Piers: | |
| Permits for construction | I, 1839 |
| Permits for construction, in Porto Rico | I, 1848 |
| Pigeon Bayous, La., improvement | I, 906; II, 2588 |
| Pine Bluff, Ark., improvement of Arkansas River at | I, 1088; II, 2658 |
| Pine Lake and River (Charlevoix Harbor), Mich., improvement | I, 1467; II, 3146 |
| Pineland, on Pine Island, Fla., to Pine Island Sound, examination and survey of channel | I, 778 |
| Pine River Reservoir, Minn.: | |
| Construction | I, 1146; II, 2787 |
| Operating and care | I, 1151; II, 2789 |
| Pittsburgh, Pa.: | |
| Engineering district | I, 1261; II, 2061 |
| Improvement of harbor | I, 1276; II, 2955 |
| Plant, floating, statement of | I, 1823; III, 8906 |
| Plaquemine Bayou, La.: | |
| Improvement | I, 906; II, 2538 |
| Operating and care of lock and dam in | I, 916; II, 2548 |
| Plaquemine Brulé Bayou, La., improvement | I, 938; II, 2559 |
| Plattsburg Harbor, N. Y., improvement | I, 262; II, 2004 |
| Playa del Rey Inlet and Basin, Venice, Cal., examination and survey | I, 1612 |
| Plymouth Harbor Mass. improvement | I, 111; II, 2015 |
| Pocomoke River, Md., improvement | I, 477; II, 2230 |
| Point Judith Harbor and Pond, R. I.: | |
| Construction of harbor of refuge | I, 140; II, 2038 |
| Examination of harbor of refuge | I, 149 |
| Improvement of pond entrance | I, 142; II, 2034 |

| | Page |
|---|-------------------------|
| Pokegama Reservoir, Minn.: | |
| Construction..... | I, 1146; II, 2737 |
| Operating and care..... | I, 1151; II, 2739 |
| Pollock Rip Channel, Mass., improvement..... | I, 119; II, 2019 |
| Polson Bay, Flathead Lake, Mont., improvement..... | I, 1785; II, 3379 |
| Ponchatoula River, La., improvement of Tickfaw River..... | I, 894; II, 2331 |
| Pontchartrain Lake, La., improvement..... | I, 888; II, 2327 |
| Poquonock River, Conn., improvement..... | I, 183; II, 2061 |
| Porcupine Island, Bar Harbor, Me., construction of breakwater..... | I, 50; II, 1978 |
| Portage Lake and Lake Superior canals, Houghton County, Mich.: | |
| Improvement..... | I, 1333; II, 3088 |
| Operating and care..... | I, 1346; II, 3045 |
| Portage Lake, Manistee County, Mich., harbor of refuge, | |
| Improvement..... | I, 1461; II, 3140 |
| Portage River, Ohio, improvement of Port Clinton Harbor..... | I, 1525; II, 3207 |
| Port Aransas, Tex.: | |
| Examination and survey of channel to San Antonio and Rockport..... | I, 1013 |
| Improvement..... | I, 1008; II, 2594 |
| Improvement of Harbor Island Harbor..... | I, 1008; II, 2594 |
| Port Arthur Canal, Tex.: | |
| Examination and survey..... | I, 1046 |
| Improvement..... | I, 1014; II, 2597 |
| Port Bolivar, Tex.: | |
| Examination and survey of channel to..... | I, 1013 |
| Improvement of channel to..... | I, 989; II, 2574 |
| Port Chester Harbor, N. Y., improvement..... | I, 202; II, 2061 |
| Port Clinton Harbor, Ohio, improvement..... | I, 1525; II, 3207 |
| Port Gamble Harbor, Wash., examination of entrance..... | I, 1791 |
| Port Henry Harbor, N. Y., improvement..... | I, 264; II, 2085 |
| Port Huron, Mich., improvement of Black River at..... | I, 1511; II, 3200 |
| Port Jefferson Harbor, N. Y., improvement..... | I, 294; II, 2111 |
| Portland and Louisville Canal, Ky.: | |
| Enlargement..... | I, 1244; II, 2877 |
| Operation and care..... | I, 1259; II, 2921 |
| Portland, Me.: | |
| Defenses..... | I, 8 |
| Engineering district..... | I, 48; II, 1975 |
| Examination of harbor, including Witch Rock..... | I, 66 |
| Improvement of harbor..... | I, 61; II, 1980 |
| Portland, Oreg., engineering districts: | |
| First..... | I, 1666; II, 3301 |
| Second..... | I, 1715; II, 3329 |
| Port Lavaca, Tex., improvement of channel to Pass Cavallo..... | I, 905; II, 2589 |
| Port O'Connor, Tex., examination and survey for deep-water harbor at..... | I, 1012 |
| Porto Rico: | |
| Engineering district..... | I, 1800; II, 3389 |
| Improvement of San Juan Harbor..... | I, 1801; II, 3389 |
| Structures in navigable waters, erection of..... | I, 1848 |
| Port Royal (Beaufort) River, S. C., waterway between Beaufort, S. C., | |
| and Savannah, improvement..... | I, 662; II, 2366 |
| Port Royal, S. C., defenses..... | I, 8 |
| Portsmouth Harbor, N. H., defenses..... | I, 8 |
| Port Townsend Bay to Oak Bay, Wash., waterway, improvement..... | I, 1761; II, 3357 |
| Port Washington Harbor, Wis., improvement..... | I, 1383; II, 3070 |
| Port Watsonville Harbor, Cal., examination and survey..... | I, 1642 |
| Port Wing, Harbor, Wis., improvement..... | I, 1325; II, 3033 |
| Position finders, range and..... | I, 11 |
| Potomac Park, Washington, D. C., improvement..... | I, 1891, 1892; II, 3713 |
| Potomac River: | |
| Aqueduct Bridge, Washington, D. C., repair..... | I, 1896 |
| Highway Bridge at Washington, D. C..... | I, 1884; II, 3722 |
| Improvement at Alexandria, Va..... | I, 483; II, 2237 |
| Improvement at Lower Cedar Point, Md..... | I, 489; II, 2239 |
| Improvement at Washington, D. C..... | I, 482; II, 2233 |
| Key Bridge, Georgetown, D. C., construction..... | I, 1572 |

INDEX.

| | | |
|--|-------|------|
| Poulsbo Bay, Wash., examination | ----- | |
| Power companies at Niagara Falls, N. Y., supervision of | ----- | |
| Power, water: | | |
| Black Warrior River, Ala., at Dam 17 | ----- | I |
| Mississippi River, dam between St. Paul and Minneapolis, Minn. | ----- | |
| Niagara River, N. Y., control and regulation | ----- | |
| Tennessee River, Elk River Shoals to Florence, Ala. | ----- | I, |
| Presque Isle Harbor, Marquette, Mich., improvement | ----- | I, |
| Presque Isle Peninsula, Erie, Pa., improvement | ----- | I, |
| Princeton, N. J., battle-field monument | ----- | |
| Printing Office, Government, Washington, D. C., telegraph line | ----- | I, I |
| Private structures and operations in navigable waters, permits for | ----- | |
| Providence Harbor and River, R. I.: | | |
| Improvement | ----- | I |
| Improvement of Pawtucket (Seekonk) River | ----- | I |
| Removal of Green Jacket Shoal | ----- | I |
| Provincetown Harbor, Mass., improvement | ----- | I |
| Public buildings and grounds, District of Columbia | ----- | I, I |
| Public Buildings Commission | ----- | I, I |
| Puget Sound, Wash.: | | |
| Defenses | ----- | |
| Improvement of, and tributaries | ----- | I, |
| Improvement of Lake Washington Canal | ----- | I, |
| Operating and care of Lake Washington Canal | ----- | I, |
| Pulneyville Harbor, N. Y., improvement | ----- | I, |
| Purification of water supply of Washington, D. C. | ----- | I, I |
| Puyallup River, Wash.: | | |
| Improvement of Puget Sound and tributaries | ----- | I, |
| Improvement of Tacoma Harbor | ----- | I, |

Q.

| | | |
|---|-------|----|
| Queens Creek, Va., examination and survey | ----- | |
| Queenstown Harbor, Md., improvement | ----- | I, |
| Queue de Tortue Bayou, La.: | | |
| Examination and survey | ----- | |
| Improvement | ----- | I, |
| Quinnipiac River, New Haven, Conn.: | | |
| Examination and survey | ----- | |
| Improvement | ----- | I, |

R.

| | | |
|--|-------|------|
| Raccoon Creek, N. J., improvement | ----- | I, |
| Racine Harbor, Wis., improvement | ----- | I, I |
| Rahway River, N. J., examination and survey | ----- | |
| Railways, military | ----- | |
| Rainier, Oreg., examination of channel to Columbia River | ----- | |
| Rainy Lake, Minn., examination and survey | ----- | |
| Rainy River, Minn., examination and survey | ----- | |
| Raisin River, Mich., improvement of Monroe Harbor | ----- | I, I |
| Range and position finders | ----- | |
| Rappahannock River, Va., improvement | ----- | I, |
| Raritan Bay and River, N. J.: | | |
| Improvement of bay | ----- | I, |
| Improvement of river | ----- | I, |
| Red Cross, memorial to women of Civil War to be used by | ----- | I, I |
| Red Hook Channel, New York Harbor, N. Y., improvement | ----- | I, |
| Red Lake and Red Lake River, Minn.: | | |
| Examination and survey | ----- | |
| Improvement | ----- | I, I |
| Red River, La., Ark., Tex., and Okla.: | | |
| Cypress Bayou and lakes to Jefferson, Tex., improvement | ----- | I, I |
| Examination for flood control | ----- | |

| | Page. |
|---|--------------------|
| Red River, La., Ark., Tex., and Okla.—Continued. | |
| Improvement above Fulton, Ark., to mouth of Washita River | i, 1036; ii, 2618 |
| Improvement below Fulton, Ark. | i, 1047; ii, 2623 |
| Jefferson-Shreveport waterway, improvement | i, 1041; ii, 2620 |
| Rectification of mouth by Mississippi River Commission | i, 1821; iii, 3411 |
| Red River of the North, Minn. and N. Dak., improvement | i, 1158; ii, 2742 |
| Redwood City Harbor, Cal., examination | i, 1042 |
| Redwood Creek, Cal., improvement | i, 1615; ii, 3269 |
| Regiments of Engineers | i, 6, 7 |
| Regulations and rules: | |
| For anchorage grounds | i, 1829 |
| For floating loose timber and logs, etc | i, 1829 |
| For navigation of canals | i, 1828 |
| For opening of drawbridges | i, 1829 |
| Rehoboth Bay, Del., waterway to Delaware Bay, improvement | i, 426; ii, 2195 |
| Republican River, Kans., protection of bank line in front of Fort Riley | |
| Military Reservation | i, 1196; ii, 2783 |
| Reservations, public. See Parks. | |
| Reserve Corps, Engineer Enlisted | i, 7 |
| Reserve Corps, Engineer Officers' | i, 4 |
| Reservoirs: | |
| Mississippi River, headwaters— | |
| Construction | i, 1146; ii, 2737 |
| Operating and care | i, 1151; ii, 2739 |
| Tidal reservoir, Potomac River, D. C. | i, 482; ii, 2233 |
| Washington Aqueduct, D. C. | i, 1876; iii, 3681 |
| Richmond Harbor, Cal., improvement | i, 1622; ii, 3272 |
| Richmond Harbor, Va., improvement of James River | i, 517; ii, 2258 |
| Riley, Fort, Kans., protection of bank line of Republican River | i, 1196; ii, 2783 |
| Rivers and harbors: | |
| Allotments and transfers under river and harbor act of Mar. 4, 1915 | i, 44 |
| Appropriations for operations during the past year | i, 43 |
| Board of Engineers for | i, 45; ii, 1969 |
| Board of Engineers, The | i, 7 |
| Bridges, construction and alteration | i, 1830 |
| Bridges, regulations for opening of draws | i, 1829 |
| Contingencies, estimate for | i, 1828 |
| Estimate of appropriations for | i, 45 |
| Expenditures during the past year | i, 43 |
| Harbor lines, establishment | i, 1841 |
| Regulations for navigation of canals | i, 1828 |
| Regulations for opening of drawbridges | i, 1829 |
| Status of works | i, 48 |
| Structures other than bridges, permits for erection | i, 1839 |
| Structures other than bridges, permits for erection in Porto Rico | i, 1848 |
| Roads: | |
| In Crater Lake National Park, Oreg. | i, 1956; iii, 3759 |
| In insular possessions | i, 26 |
| In Yellowstone National Park | i, 1940; iii, 3745 |
| Roanoke River, N. C., improvement | i, 546; ii, 2272 |
| Rockaway Inlet, N. Y., examination and survey of shore front to Jones | |
| Inlet | i, 310 |
| Rockhall Harbor, Md., improvement | i, 443; ii, 2210 |
| Rock Island, Ill., engineering district | i, 1121; ii, 2699 |
| Rockland Harbor, Me., improvement | i, 55; ii, 1978 |
| Rockport, Mass., harbor of refuge in Sandy Bay, construction of | i, 74; ii, 1968 |
| Rock River, Ill. and Wis.: | |
| Illinois and Mississippi Canal— | |
| Improvement | i, 1133; ii, 2728 |
| Operating and care | i, 1134; ii, 2729 |
| Operating snag boats and dredge boats | i, 1131; ii, 2726 |
| Rogers City Harbor, Mich., improvement | i, 1502; ii, 3193 |
| Romerly Marsh, Ga., improvement of waterway via | i, 684; ii, 2367 |
| Rondout Harbor, N. Y., improvement | i, 253; ii, 2091 |
| Rouge River, Mich.: | |
| Examination and survey | i, 1521 |
| Improvement | i, 1515; ii, 3202 |

| | Page. |
|---|-------------------|
| Rough River, Ky., operating and care of lock and dam | i, 1300; ii, 2999 |
| Round Lake, Charlevoix Harbor, Mich., improvement | i, 1467; ii, 3146 |
| Rules and regulations: | |
| For anchorage grounds | i, 1829 |
| For floating loose timber and logs, etc. | i, 1829 |
| For navigation of canals | i, 1828 |
| For opening of drawbridges | i, 1829 |
| S. | |
| Sabine and Galveston Section of Inland Waterway, Tex., examination and survey | i, 1018 |
| Sabine-Neches Canal: | |
| Contributions for improvement | i, 1021; ii, 2602 |
| Examination and survey | i, 1046 |
| Improvement | i, 1018; ii, 2602 |
| Sabine River, Tex.: | |
| Improvement of Sabine-Neches Canal | i, 1018; ii, 2602 |
| Improvement of Sabine Pass Harbor | i, 1014; ii, 2597 |
| Improvement of waterway to Mermentau River, La. | i, 924; ii, 2551 |
| Improvement of waterway to Mississippi River | i, 921; ii, 2549 |
| Saco River, Me., improvement | i, 63; ii, 1982 |
| Sacramento River, Cal.: | |
| Alleviation of debris by California Débris Commission | i, 1815; ii, 3401 |
| Examination from Chico Landing to Red Bluff | i, 1065 |
| Flood control by California Débris Commission | i, 1818; ii, 3405 |
| Improvement | i, 1637; ii, 3290 |
| Saginaw River, Mich., improvement | i, 1508; ii, 3193 |
| St. Albans Harbor, Vt., improvement | i, 266; ii, 2096 |
| St. Andrews Bay, Fla.: | |
| Improvement of bay | i, 801; ii, 2446 |
| Improvement of channel to Apalachicola River | i, 796; ii, 2443 |
| St. Clair Flats Canal, Lake, and River, Mich.: | |
| Improvement of channels in Lake St. Clair | i, 1488; ii, 3159 |
| Improvement of channels in waters connecting the Great Lakes | i, 1477; ii, 3153 |
| Improvement of river | i, 1486; ii, 3158 |
| Operating and care of canal | i, 1497; ii, 3190 |
| Reexamination of Grosse Pointe Channel | i, 1521 |
| St. Croix River, Me., improvement | i, 48; ii, 1975 |
| St. Croix River, Wis. and Minn.: | |
| Examination and survey | i, 1166 |
| Improvement | i, 1152; ii, 2740 |
| Operating snag boats and dredge boats | i, 1131; ii, 2726 |
| St. Francis River, Ark.: | |
| Examination and survey | i, 1114 |
| Improvement | i, 1105; ii, 2671 |
| St. George Sound, Fla.: | |
| Examination and survey of waterway to Tampa Bay | i, 779 |
| Improvement of Carrabelle Harbor | i, 780; ii, 2427 |
| St. Helena, Oreg., examination of channel to Columbia River | i, 1747 |
| St. Joe River, Idaho, examination and survey | i, 1791 |
| St. Johns River, Fla.: | |
| Improvement at Jacksonville | i, 703; ii, 2386 |
| Improvement between Jacksonville and Palatka, including Orange Mills Flats | i, 705; ii, 2387 |
| Improvement between Palatka and Lake Harney | i, 707; ii, 2389 |
| Improvement, Jacksonville to the ocean | i, 698; ii, 2381 |
| Improvement of Volusia Bar and between Volusia Bar and Lake Monroe | i, 707; ii, 2389 |
| Improvement of waterway to Beaufort, S. C. | i, 662; ii, 2360 |
| Improvement of waterway to Cumberland Sound | i, 667; ii, 2368 |
| St. Jones River, Del., improvement | i, 417; ii, 2190 |
| St. Joseph Bay, Fla., improvement of entrance | i, 799; ii, 2445 |

| | Page. |
|---|--------------------|
| St. Joseph Harbor and River, Mich.: | |
| Improvement of harbor | I, 1430; II, 3107 |
| Improvement of river | I, 1433; II, 3111 |
| St. Louis Bay and River, Minn. and Wis., improvement | I, 1319; II, 3030 |
| St. Louis, Mo., engineering district | I, 1115; II, 2677 |
| St. Lucie Inlet, Fla.: | |
| Improvement | I, 720; II, 2397 |
| Reexamination | I, 779 |
| St. Marys River and St. Marys Falls Canal, Mich.: | |
| Channels in waters connecting the Great Lakes, improve- | |
| ment | I, 1477; II, 3153 |
| Commercial statistics | I, 1497; II, 3170 |
| Improvement of river at the falls, including Hay Lake and Neebish | |
| Channels | I, 1477; II, 3153 |
| Operating and care of canal | I, 1496; II, 3166 |
| Surveys, etc. | I, 1916; III, 3731 |
| St. Marys River, Ga. and Fla., improvement | I, 679; II, 2373 |
| St. Marys River, Idaho, examination and survey | I, 1791 |
| St. Paul, Minn.: | |
| Engineering district | I, 1136; II, 2733 |
| Examination and survey of harbor | I, 1167 |
| Gaging Mississippi River at | I, 1152; II, 2740 |
| St. Petersburg Harbor, Fla., improvement | I, 771; II, 2424 |
| Salem Harbor, Mass., improvement | I, 92; II, 2002 |
| Salem River, N. J., improvement | I, 337; II, 2171 |
| Saline River, Ark., improvement | I, 1064; II, 2636 |
| Salmon Bay, Wash.: | |
| Improvement of Lake Washington Canal | I, 1768; II, 3364 |
| Operating and care of Lake Washington Canal | I, 1785; II, 3377 |
| Salmon Creek, Pultneyville Harbor, N. Y., improvement | I, 1532; II, 3249 |
| Sam Houston, Fort, Tex., engineer depot | I, 35 |
| Sammamish River, Wash., examination from Lake Washington to Bothell | I, 1791 |
| Sampt River (Georgetown Harbor), S. C., improvement | I, 616; II, 2333 |
| San Antonio and Rockport, Tex., to Harbor Island and Port of Aransas, | |
| examination and survey of channel | I, 1013 |
| San Antonio Bay, Tex., improvement of waterway via | I, 993; II, 2588 |
| San Antonio River, Tex.: | |
| Examination and survey | I, 1013 |
| Examination for flood control | I, 1013 |
| San Antonio, Tex., engineer depot | I, 35 |
| San Bernard River, Tex., examination and survey | I, 1013 |
| Sandbeach (Harbor Beach), Mich., improvement of harbor of | |
| refuge | I, 1506; II, 3196 |
| San Diego Harbor, Cal.: | |
| Defenses | I, 8 |
| Improvement | I, 1590; II, 3261 |
| Sandusky Harbor, Ohio, improvement | I, 1527; II, 3208 |
| Sandy Bay, Cape Ann, Mass., construction of harbor of refuge | I, 74; II, 1988 |
| Sandy Hook Reservation, N. J., protection of | I, 15 |
| Sandy Lake Reservoir, Minn.: | |
| Construction | I, 1146; II, 2737 |
| Operating and care | I, 1151; II, 2739 |
| San Francisco Bay and Harbor, Cal.: | |
| Defenses | I, 8 |
| Engineering districts— | |
| First | I, 1612; II, 3267 |
| Third | I, 1642; II, 3283 |
| Examination of bay | I, 1641 |
| Examination of south end of bay to provide harbor for Santa Clara | |
| Valley | I, 1642 |
| Improvement by removal of rocks | I, 1613; II, 3267 |
| Improvement of Oakland Harbor | I, 1618; II, 3269 |
| San Jacinto River, Tex., improvement of waterway via | I, 961; II, 2575 |
| San Joaquin River, Cal.: | |
| Examinations and surveys | I, 1666 |
| Improvement | I, 1642; II, 3283 |
| Improvement of Stockton and Mormon Channels | I, 1651; II, 3283 |
| Work of California Débris Commission | I, 1805; II, 3363 |

INDEX.

| | |
|--|-----------|
| San Juan Harbor, P. R., improvement..... | 1, 1 |
| San Leandro Bay, Oakland Harbor, Cal., improvement..... | 1, 1 |
| San Luis Obispo Harbor, Cal., improvement..... | 1, 1 |
| San Pablo Bay, Cal.: | |
| Improvement..... | 1, 1 |
| Improvement, including Mare Island Strait..... | 1, 1 |
| San Pedro Bay and Harbor, Cal.: | |
| Construction of deep-water harbor..... | 1, 1 |
| Improvement of Wilmington inner harbor..... | 1, 1 |
| Santa Cruz Harbor, Cal., examination..... | |
| Santa Rosa Sound, Fla., improvement of The Narrows..... | 1, 1 |
| Santee River, S. C., improvement..... | 1, 1 |
| Sapelo Bar and Harbor, Ga., improvement..... | 1, 1 |
| Sarasota Bay, Fla.: | |
| Examination and survey of waterway to Miakka River, Fla..... | |
| Improvement..... | 1, 1 |
| Satilla River, Ga., improvement..... | 1, 1 |
| Saugatuck Harbor and Kalamazoo River, Mich., examination and sur..... | |
| Saugatuck Harbor, Mich., improvement..... | 1, 1 |
| Saugatuck River, Conn., improvement..... | 1, 1 |
| Saugerties Harbor, N. Y., improvement..... | 1, 1 |
| Saugus River, Lynn Harbor, Mass., improvement..... | 1, 1 |
| Savannah, Ga., engineering district..... | 1, 1 |
| Savannah Harbor and River, Ga.: | |
| Defenses..... | |
| Examinations and surveys..... | |
| Improvement of harbor..... | 1, 1 |
| Improvement of river above Augusta..... | 1, 1 |
| Improvement of river at Augusta..... | 1, 1 |
| Improvement of river below Augusta..... | 1, 1 |
| Improvement of waterway to Beaufort, S. C..... | 1, 1 |
| Improvement of waterway to Fernandina, Fla..... | 1, 1 |
| Saw Pit Creek, improvement of waterway via..... | 1, 1 |
| Saybrook Harbor, Connecticut River, Conn., improvement..... | 1, 1 |
| School, Engineer, buildings for..... | |
| Schooner Bayou, La., operating and care of lock..... | 1, 1 |
| Schuylkill River, Pa., improvement..... | 1, 1 |
| Scioto River and its tributaries, Ohio, examination for flood control..... | |
| Scott Point, Tennessee River, Ala., lock and dam at Hales Bar, oper..... | |
| and care..... | 1, 1 |
| Scuppernon River, N. C., improvement..... | 1, 1 |
| Seacoast defenses..... | |
| Sea Gate, Coney Island, N. Y., examination and survey..... | |
| Searchlights..... | |
| Searcy Creek, Fla., improvement of waterway via..... | 1, 1 |
| Seattle, Wash.: | |
| Engineering district..... | 1, 1 |
| Examinations of east and west waterways in harbor..... | |
| Sea walls: | |
| Defenses of Galveston, Tex..... | |
| Embankments and..... | |
| Hawaiian Islands..... | |
| Seekonk (Pawtucket) River, R. I., improvement..... | 1, 1 |
| Shallotte River, N. C., improvement..... | 1, 1 |
| Shallowbag Bay, N. C., improvement..... | 1, 1 |
| Shaws Cove, New London, Conn., improvement..... | 1, 157, 1 |
| Sheboygan Harbor, Wis., improvement..... | 1, 1 |
| Sheepshead Bay, N. Y.: | |
| Examination and survey..... | |
| Improvement..... | 1, 1 |
| Sheffield Island Harbor, Conn., improvement of Norwalk Harbor..... | 1, 1 |
| Shinnecock Bay, N. Y., examination and survey..... | |
| Ship Island Harbor and Pass, Miss., improvement of pass and ch..... | |
| to Gulfport..... | 1, 1 |
| Shoal Harbor, N. J., improvement..... | 1, 1 |
| Shooters Island Channel, N. Y. and N. J., improvement..... | 1, 1 |

| | Page. |
|---|-----------------------------|
| Shreveport, La., to Jefferson, Tex., improvement of waterway | I, 1041; II, 2620 |
| Shrewsbury River, N. J., improvement | I, 345; II, 2142 |
| Silver Springs Run, Fla.: | |
| Examinations and surveys of canal to Ocala, Fla. | I, 778 |
| Improvement | I, 712; II, 2392 |
| Sims Clip, removal of | I, 351; II, 2145 |
| Sisters Creek, Fla., improvement of waterway via | I, 667; II, 2368 |
| Sites for fortifications | I, 12, 22 |
| Siuslaw River, Oreg.: | |
| Examination and survey | I, 1714 |
| Improvement | I, 1678; II, 3306 |
| Skagit River, Wash., improvement | I, 1775; II, 3374 |
| Skidaway Narrows, Ga., improvement of waterway via | I, 664; II, 2367 |
| Slack-water systems. <i>See</i> Canals and Waterways. | |
| Slaughter Creek, Md., improvement | I, 462; II, 2221 |
| Smiths Creek, N. C., improvement | I, 567; II, 2290 |
| Smyrna River, Del., improvement | I, 411; II, 2185 |
| Snake River at mouth at Nome Harbor, Alaska, examination | I, 1791 |
| Snake River, Idaho, Oreg., and Wash.: | |
| Examinations and surveys | I, 1715 |
| Improvement | I, 1706; II, 3322 |
| Snohomish River, Wash.: | |
| Examination | I, 1791 |
| Improvement | I, 1773; II, 3373 |
| Soda Lake, Ia., improvement of waterway via | I, 1041; II, 2620 |
| South Branch, Chicago River, Ill., improvement | I, 1406; II, 3089 |
| South Branch, Shrewsbury River, N. J., improvement | I, 345; II, 2142 |
| South Chicago Harbor, Ill., improvement | I, 1409; II, 3090 |
| Southern Branch, Elizabeth River, Va., improvement | I, 508; II, 2253 |
| Southern Department, engineer depots | I, 35 |
| South Haven Harbor, Mich., improvement | I, 1435; II, 3111 |
| South Norwalk Harbor, Conn., improvement | I, 191; II, 2055 |
| South Pass, Mississippi River: | |
| Examinations and surveys | I, 885; II, 2524 |
| Maintenance of channel | I, 882; II, 2518 |
| Southport Harbor, Conn., improvement | I, 187; II, 2053 |
| South River, N. C., improvement | I, 500; II, 2284 |
| South River, N. J., improvement | I, 334; II, 2136 |
| Southwest Baltimore, Md., improvement at Spring Garden | I, 434; II, 2201 |
| Southwest Pass, Mississippi River, improvement, including shoals between Cubits Gap and Head of Passes, and dredge construction | I, 877; II, 2505 |
| Spring Garden, Baltimore, Md., improvement of harbor at | I, 434; II, 2201 |
| Spuyten Duyvil Creek, N. Y., improvement | I, 228; II, 2074 |
| Stamford Harbor, Conn., improvement | I, 195; II, 2057 |
| Staten Island-New Jersey Channels, improvement | I, 319, 323; II, 2127, 2130 |
| Staten Island, N. Y.: | |
| Examination and survey of Great Kills | I, 350 |
| Examination and survey of Lemon Creek | I, 349 |
| Staten Island Sound (Arthur Kill), N. Y. and N. J., improvement | I, 319, 323; II, 2127, 2130 |
| Statues, memorials, etc.: | |
| Abraham Lincoln memorial | I, 1904; III, 3724 |
| Arlington memorial amphitheater and chapel | I, 1905; III, 3726 |
| In public grounds, Washington, D. C. | I, 1884; III, 3720 |
| Macdonough memorials, Lake Champlain, N. Y. and Vt. | I, 1960 |
| Memorial to Gen. Ulysses S. Grant | I, 1903; III, 3724 |
| Monument and wharf at Wakefield, Va. | I, 1903; III, 3724 |
| Monument at Germantown, Pa. | I, 1962 |
| Monument at Horseshoe battle ground, Ala. | I, 1964 |
| Monument at Valley Forge, Pa. | I, 1960 |
| Monument on Princeton battle field | I, 1963 |
| Monument to Commodore John Barry | I, 1904; III, 3724 |
| Monument to Francis Scott Key | I, 1905; III, 3727 |
| Red Cross, memorial to women of Civil War to be used by | I, 1905; III, 3725 |
| Steele Bayou, Miss.: | |
| Improvement | I, 1083; II, 2650 |
| Reexamination | I, 1087 |

| | Page. |
|--|-----------------------------|
| Stockton Channel, San Joaquin River, Cal.: | |
| Examination and survey | i, 1666 |
| Improvement | i, 1651; ii, 3233 |
| Stonington Harbor, Conn. | i, 153; ii, 2038 |
| Structures in navigable waters: | |
| Permits for erection of, in Porto Rico | i, 1848 |
| Permits for private structures and operations | i, 1839 |
| Sturgeon Bay and Lake Michigan Canal, Wis.: | |
| Improvement | i, 1866; ii, 3059 |
| Operating and care | i, 1400; ii, 3081 |
| Subic Bay, P. I., defenses | i, 20 |
| Submarine defense | i, 17 |
| Suisun Bay, Cal., examination of channel from Martinez to Antioch | i, 1642 |
| Suisun Creek or Channel, Cal., improvement | i, 1626; ii, 3274 |
| Sulphur River, Ark. and Tex.: | |
| Examination and survey | i, 1047 |
| Examination and survey of Days Creek and | i, 1047 |
| Improvement | i, 1039; ii, 2620 |
| Sunflower River, Miss., improvement of Big Sunflower River | i, 1079; ii, 2646 |
| Sunken craft, removal of. <i>See</i> Wrecks. | |
| Superior Bay and Harbor, Wis., improvement of Duluth-Superior Harbor | i, 1319; ii, 3030 |
| Superior, Lake: | |
| Channels in waters connecting Great Lakes, improvement | i, 1477; ii, 3153 |
| Examination of harbors and connecting waters of Great Lakes | i, 1597 |
| Keweenaw Bay-Lake Superior waterway, Mich.— | |
| Improvement | i, 1333; ii, 3033 |
| Operating and care | i, 1346; ii, 3045 |
| Surveys, charts, etc. | i, 1916; iii, 3731 |
| Water levels | i, 1926; iii, 3740 |
| Supervision of New York Harbor, N. Y. | i, 1849; iii, 3661 |
| Surface levels. <i>See</i> Water levels. | |
| Surveys: | |
| Of Northern and Northwestern Lakes | i, 1916; iii, 3731 |
| Of rivers and harbors, estimate of appropriation for | i, 1828 |
| Ohio River | i, 1244; ii, 2833 |
| Susquehanna River, Md.: | |
| Examination and survey of North Branch | i, 481 |
| Improvement | i, 438; ii, 2207 |
| Suwannee River, Fla., improvement | i, 755; ii, 2414 |
| Swan Island, Kennebec River, Me., examination of channel west of | i, 67 |
| Swan Quarter Bay to Deep Bay, N. C., improvement of waterway | i, 554; ii, 2279 |
| Swansboro, N. C., waterway to New River and Beaufort: | |
| Improvement | i, 586, 588; ii, 2304, 2306 |
| Reexamination | i, 615 |
| Swift Creek, N. C., improvement | i, 560; ii, 2291 |
| Swinomish Slough, Wash., improvement | i, 1777; ii, 3374 |

T.

| | |
|---|-----------------------------|
| Tacoma Harbor, Wash., improvement | i, 1764; ii, 3350 |
| Tallahatchie River, Miss., improvement | i, 1075; ii, 2644 |
| Tallapoosa River, Ala., monument at Horseshoe Battle Ground | i, 1964 |
| Tampa Bay and Harbor, Fla.: | |
| Defenses | i, 8 |
| Examination and survey of harbor | i, 778 |
| Examination and survey of waterway to St. George Sound | i, 779 |
| Improvement of bay | i, 758; ii, 2415 |
| Improvement of channel to Clearwater Harbor | i, 745; ii, 2410 |
| Improvement of Hillsboro Bay and River | i, 761, 766; ii, 2418, 2421 |
| Tangipahoa River, La., examination and survey | i, 949 |
| Tar River, N. C.: | |
| Examination and survey | i, 616 |
| Improvement | i, 556; ii, 2280 |
| Tarrytown Harbor, N. Y., improvement | i, 244; ii, 2086 |

| | Page. |
|---|-------------------|
| Taunton River, Mass.: | |
| Examination and survey | I, 149 |
| Improvement | I, 128; II, 2028 |
| Tchula Lake, Miss.: | |
| Examination and survey | I, 1087 |
| Improvement | I, 1073; II, 2643 |
| Teche Bayou, La.: | |
| Improvement | I, 912; II, 2541 |
| Improvement of waterway from Franklin to Mermentau | I, 921; II, 2549 |
| Operating and care of Keystone Lock | I, 917; II, 2546 |
| Telegraph line, Government, Washington, D. C. | I, 1884; II, 3722 |
| Tennessee River: | |
| Above Chattanooga, improvement | I, 1211; II, 2805 |
| Bee Tree Shoals Canal, Ala., operating and care | I, 1235; II, 2829 |
| Below Riverton, Ala., improvement | I, 1228; II, 2819 |
| Browns Island to Florence, improvement | I, 1233; II, 2813 |
| Chattanooga to Hales Bar, improvement | I, 1216; II, 2813 |
| Chattanooga to Riverton, improvement | I, 1216; II, 2813 |
| Colbert Shoals Canal, operating and care | I, 1235; II, 2829 |
| Elk River Shoals Canal, Ala., operating and care | I, 1233; II, 2825 |
| Florence to Colbert Shoals, improvement | I, 1216; II, 2813 |
| Hales Bar Lock and Dam, operating and care | I, 1232; II, 2824 |
| Hales Bar to Browns Island, improvement | I, 1216; II, 2813 |
| Muscle Shoals Canal, operating and care | I, 1233; II, 2825 |
| Tensas River, La., improvement | I, 1058; II, 2632 |
| Terra Ceia Cut-off, Fla., improvement | I, 768; II, 2422 |
| Terrebonne Bayou, La., improvement | I, 904; II, 2536 |
| Texas City Harbor, Tex.: | |
| Examination and survey | I, 1013 |
| Improvement of channel to Galveston | I, 957; II, 2572 |
| Texas, State, removal of water hyacinths | I, 945; II, 2563 |
| Thames River, Conn.: | |
| Improvement | I, 159; II, 2041 |
| Improvement of New London Harbor | I, 157; II, 2039 |
| The Board of Engineers | I, 7 |
| Thimble Shoal, Chesapeake Bay, Va., improvement | I, 512; II, 2256 |
| Thomaston Harbor, Me., improvement | I, 57; II, 1979 |
| Threemile Rapids, Columbia River, Oreg., and Wash., improvement | I, 1700; II, 3316 |
| Thunder Bay Harbor and River, Mich.: | |
| Examinations and surveys | I, 1521 |
| Improvement | I, 1504; II, 3194 |
| Tickfaw River, La., improvement of, including tributaries | I, 1894; II, 2531 |
| Tilghman Island Harbor, Md., improvement | I, 451; II, 2215 |
| Tillamook Bay and Bar, Oreg., improvement | I, 1686; II, 3310 |
| Toledo Harbor, Ohio: | |
| Examination for waterway to Lake Michigan | I, 1557 |
| Improvement | I, 1522; II, 3205 |
| Tolovano River, Alaska, examination and survey | I, 1791 |
| Tombigbee River, Ala. and Miss.: | |
| Demopolis, Ala., improvement below (construction of locks and dams) | I, 840; II, 2479 |
| Demopolis, Ala., improvement below (maintenance) | I, 845; II, 2480 |
| Demopolis, Ala., to Walkers Bridge, Miss., improvement | I, 848; II, 2483 |
| Operating and care of locks and dams | I, 851; II, 2486 |
| Toms River, N. J., improvement | I, 403; II, 2181 |
| Tonawanda Harbor, N. Y., improvement | I, 1567; II, 3235 |
| Towboats, experimental, for use on Mississippi River | I, 1825; II, 3405 |
| Town Creek, Brunswick County, N. C., examination and survey | I, 615 |
| Trail Creek, Michigan City Harbor, Ind., improvement | I, 1419; II, 3097 |
| Training camps, Engineer officers' | I, 5 |
| Traps, fish, permits for construction | I, 1339 |
| Traverse Lake, Minn. and S. Dak.: | |
| Examination and survey | I, 1166 |
| Improvement | I, 1157; II, 2742 |
| Tred Avon River, Md., improvement | I, 452; II, 2215 |

| | Page. |
|---|-------------------|
| Trent River, N. C., improvement | i, 573; ii, 2293 |
| Trinity River, Tex.: | |
| Examination and survey | i, 1046 |
| Examination for flood control | i, 1047 |
| Improvement above mouth | i, 1027; ii, 2608 |
| Improvement of mouth | i, 973; ii, 2581 |
| Operating and care of locks and dams, section 1 | i, 1032; ii, 2614 |
| Troops: | |
| Engineer equipment | i, 36 |
| Increase of companies to maximum strength | i, 6 |
| New Engineer organizations | i, 6 |
| Troy lock and dam, Hudson River, N. Y., operating and care | i, 244; ii, 2085 |
| Tuckahoe River, Md., improvement | i, 457; ii, 2218 |
| Tuckerton Creek, N. J., improvement | i, 401; ii, 2180 |
| Tugaloo River, Ga., examination and survey | i, 698 |
| Tug Fork, Big Sandy River, W. Va. and Ky.: | |
| Improvement | i, 1305; ii, 3011 |
| Operating and care of locks and dams | i, 1309; ii, 3014 |
| Turners Cut, N. C., improvement of waterway via | i, 534; ii, 2265 |
| Turtle Bayou, Tex., improvement | i, 975; ii, 2582 |
| Turtle Cove Channel, Port Aransas, Tex., examination and survey | i, 1013 |
| Turtle Cove, Tex., improvement of waterway via | i, 999; ii, 2590 |
| Turtle River, Brunswick Harbor, Ga., improvement | i, 692; ii, 2377 |
| Twelvemile Bayou, La., improvement of waterway via | i, 1041; ii, 2620 |
| Twitch Cove and Big Thoroughfare River, Md., improvement | i, 479; ii, 2231 |
| Two Rivers Harbor, Wis., improvement | i, 1375; ii, 3065 |
| Tyaskin (Wetipquin) Creek, Md., improvement | i, 467; ii, 2224 |
| Tygar's River, W. Va., examination for flood control | i, 1827 |

U.

| | |
|---|-------------------|
| Umpqua River, Oreg., examinations of bar and entrance | i, 1714, 1715 |
| Union Lake, Wash., improvement of waterway via | i, 1768; ii, 3364 |
| Upper Chipola River, Fla.: | |
| Improvement | i, 789; ii, 2432 |
| Reexamination | i, 831 |
| Upper Pasquotank River, N. C., examination and survey | i, 549 |
| Upper White River, Ark., operation of locks and dams | i, 1112; ii, 2673 |
| Urbanna Creek, Va., improvement | i, 498; ii, 2244 |

V.

| | |
|---|-------------------|
| Valley Creek, Ala., examination and survey | i, 876 |
| Valley Forge, Pa., memorial arch | i, 1902 |
| Vancouver Barracks, engineer depot | i, 32 |
| Vermilion Bay and River, La., improvement of waterway via | i, 921; ii, 2540 |
| Vermilion Bayou, La., improvement of channel, bay, and passes | i, 930; ii, 2554 |
| Vermilion, Clay County, S. Dak., bank revetment on Missouri River | |
| at | i, 1181; ii, 2771 |
| Vermilion Harbor, Ohio, improvement | i, 1535; ii, 3211 |
| Vicksburg, Miss., engineering district | i, 1047; ii, 2623 |
| Victoria, Tex., improvement of channel to Aransas Pass | i, 993; ii, 2588 |
| Virginia coast waterway, improvement | i, 431; ii, 2198 |
| Virgin River, Nev., examination and survey | i, 1612 |
| Volusia Bar, St. Johns River, Fla., improvement | i, 707; ii, 2380 |

W.

| | |
|--|--------------------|
| Wabash River, Ind. and Ill.: | |
| Examination of river and tributaries for flood control | i, 1827 |
| Operating and care of lock and dam | i, 1292; ii, 2987 |
| Waccamaw River, N. C. and S. C., improvement | i, 621; ii, 2338 |
| Wakefield, Va., monument and wharf at | i, 1903; iii, 3724 |
| Wallabout Channel, N. Y., improvement | i, 282; ii, 2106 |
| Wappinger Creek, N. Y., improvement | i, 249; ii, 2080 |
| War Department maps | i, 30 |

| | Page. |
|--|--------------------|
| Warrior River, Ala.: | |
| Examination and survey of Mulberry Fork | i, 876 |
| Improvement | i, 840; ii, 2479 |
| Operating and care of locks and dams on Black Warrior River | i, 851; |
| | ii, 2486 |
| Warroad Harbor and River, Minn., improvement | i, 1161; ii, 2743 |
| Warwick River, Md., improvement | i, 458; ii, 2219 |
| Washington Barracks, D. C.: | |
| Engineer depot | i, 32 |
| Engineer post and school, buildings for | i, 42 |
| Engineer School | i, 41 |
| Washington Bayou and Lake, Miss.: | |
| Improvement | i, 1083; ii, 2650 |
| Reexamination | i, 1087 |
| Washington, D. C.: | |
| Anacostia River, reclamation of flats | i, 1861; iii, 3675 |
| Aqueduct Bridge across Potomac River, repair | i, 1866 |
| Aqueduct, filtration plant | i, 1876; iii, 3681 |
| Aqueduct, maintenance and repair | i, 1876; iii, 3681 |
| Defenses | i, 8 |
| Engineer depot | i, 32 |
| Engineering district | i, 481; ii, 2233 |
| Engineer post and school, buildings for | i, 42 |
| Engineer School | i, 41 |
| Executive Mansion and Office | i, 1884; iii, 3696 |
| Highway Bridge, Potomac River | i, 1884; iii, 3722 |
| Improvement of Anacostia River at | i, 485; ii, 2235 |
| Improvement of Potomac River at | i, 482; ii, 2233 |
| Key Bridge, Potomac River | i, 1872 |
| McMillan Park Reservoir | i, 1876; iii, 3692 |
| Public buildings and grounds, and Washington Monument | i, 1884; iii, 3697 |
| Telegraph line connecting executive departments | i, 1884; iii, 3722 |
| Water supply, increase | i, 1876; iii, 3681 |
| Washington, George, monument to, at Washington, D. C. | i, 1884; iii, 3718 |
| Washington Lake, Miss., improvement | i, 1083; ii, 2650 |
| Washington Lake, Wash.: | |
| Improvement of waterway to Puget Sound | i, 1768; ii, 3364 |
| Operating and care of waterway to Puget Sound | i, 1785; ii, 3377 |
| Washita (Ouchita) River, Ark. and La.: | |
| Improvement | i, 1052; ii, 2627 |
| Operating and care of locks and dams | i, 1069; ii, 2639 |
| Washougal Slough, Wash., examination and survey | i, 1715 |
| Wateree River, S. C., improvement | i, 631; ii, 2347 |
| Water hyacinths, removal of: | |
| From Alabama, Mississippi, Louisiana, and Texas waters | i, 945; ii, 2563 |
| From Florida waters | i, 775; ii, 2426 |
| Water levels: | |
| Mississippi River and principal tributaries, gaging | i, 1152; ii, 2740 |
| Northern and northwestern lakes, levels, etc. | i, 1926; iii, 3740 |
| Water meters, installation in certain Government buildings | i, 1876; iii, 3681 |
| Water power: | |
| Black Warrior River, Ala., at Dam 17 | i, 840; ii, 2479 |
| Mississippi River, dam between Minneapolis and St. Paul, | |
| Minn. | i, 1137; ii, 2733 |
| Niagara River, N. Y., control and regulation of | i, 1932 |
| Tennessee River, Elk River Shoals to Florence, Ala. | i, 1233; ii, 2825 |
| Waters, navigable. <i>See</i> Bridges, Rivers and harbors, and Wrecks. | |
| Water supply, Washington, D. C. | i, 1876; iii, 3692 |
| Waterways: | |
| <i>See also</i> Canals. | |
| Beaufort, N. C., to New River, improvement | i, 588; ii, 2306 |
| Beaufort, S. C., to St. Johns River, Fla., improvement | i, 662; ii, 2366 |
| Beaufort to Jacksonville, N. C., improvement | i, 584; ii, 2303 |
| Charleston to McClellanville, S. C., improvement | i, 638; ii, 2351 |
| Clearwater Bay to Boca Ceiga Bay, Fla., improvement | i, 745; ii, 2410 |
| Core Sound to Beaufort Harbor, improvement | i, 582; ii, 2301 |

Waterways—Continued.

| | Page. |
|--|-----------------------------|
| Delaware Bay, Del., to Chincoteague Bay, Va., improvement..... | i, 429; ii, 2197 |
| Delaware Bay to Rehoboth, Del., improvement..... | i, 426; ii, 2195 |
| Galveston to Corpus Christi, improvement..... | i, 989; ii, 2586 |
| Galveston to Houston, Tex., improvement..... | i, 961; ii, 2575 |
| Keweenaw Bay to Lake Superior, Mich.— | |
| Improvement..... | i, 1333; ii, 3038 |
| Operating and care..... | i, 1346; ii, 3045 |
| Mississippi River to Sabine River— | |
| Franklin, La., to Mermentau River, improvement..... | i, 921; ii, 2549 |
| Mermentau River to Sabine River, La., improvement..... | i, 924; ii, 2551 |
| Operating and care of Schooner Bayou Lock..... | i, 929; ii, 2553 |
| New Jersey coast waterway, Cape May to New York Bay, N. Y. and | |
| N. J., examination and survey..... | i, 433 |
| New River, N. C., to Swansboro and Beaufort— | |
| Improvement..... | i, 586, 588; ii, 2304, 2306 |
| Reexamination..... | i, 615 |
| Norfolk, Va., to Beaufort Inlet, N. C.— | |
| Improvement..... | i, 536; ii, 2266 |
| Operating and care..... | i, 541; ii, 2269 |
| Norfolk, Va., to sounds of North Carolina, improvement..... | i, 534; ii, 2265 |
| Pamlico Sound, N. C., to Beaufort Inlet, improvement..... | i, 570; ii, 2296 |
| Port Townsend Bay to Oak Bay, Wash., improvement..... | i, 1701; ii, 3357 |
| Puget Sound to Lake Washington— | |
| Improvement..... | i, 1768; ii, 3364 |
| Operating and care..... | i, 1785; ii, 3377 |
| Savannah, Ga., to Beaufort, S. C., improvement..... | i, 602; ii, 2366 |
| Savannah, Ga., to Fernadina, Fla., improvement..... | i, 604; ii, 2367 |
| Swan Quarter Bay to Deep Bay, N. C., improvement..... | i, 554; ii, 2279 |
| Virginia coast waterway, improvement..... | i, 431; ii, 2198 |
| Waukegan Harbor, Ill., improvement..... | i, 1390; ii, 3078 |
| Weirs, permits for construction..... | i, 1839 |
| Welland Canal, report as to character of vessels expected to use canal | |
| when enlarged..... | i, 1597 |
| Wenona, Deal Island, Md., improvement of Lower Thoroughfare | |
| at..... | i, 473; ii, 2227 |
| Westchester Creek, N. Y., improvement..... | i, 214; ii, 2066 |
| West Creek, N. J., examination and survey..... | i, 432 |
| Western Branch, Elizabeth River, Va., improvement..... | i, 508; ii, 2253 |
| West Fork of South Branch, Chicago River, Ill., improvement..... | i, 1406; ii, 3089 |
| West Fork River, W. Va., examination for flood control..... | i, 1827 |
| West Galveston Bay and Brazos River Canal, Tex., improvement..... | i, 989; ii, 2586 |
| West Neebish Channel, St. Mary's River, Mich., improvement..... | i, 1477; ii, 3153 |
| Westport Harbor, Conn., improvement..... | i, 189; ii, 2054 |
| West River, Conn., improvement..... | i, 172; ii, 2047 |
| Wetappo Creek, Fla., improvement of waterway via..... | i, 796; ii, 2443 |
| Wetipquin (Tyaskin) Creek, Md., improvement..... | i, 467; ii, 2224 |
| Weymouth Back River, Mass..... | i, 109; ii, 2013 |
| Weymouth Fore River, Mass..... | i, 105; ii, 2012 |
| Wharves: | |
| Permits for construction..... | i, 1839 |
| Permits for construction in Porto Rico..... | i, 1848 |
| Whatcom (Bellingham) Harbor, Wash., improvement of Whatcom Creek | |
| waterway..... | i, 1779; ii, 3375 |
| Wheeling, W. Va., engineering district..... | i, 1231; ii, 2959 |
| Whitehall Harbor, N. Y., Narrows of Lake Champlain, improvement..... | i, 256; ii, 2092 |
| White House, Washington, D. C..... | i, 1884; ii, 3698 |
| White Lake Harbor, Mich.: | |
| Examination and survey..... | i, 1476 |
| Improvement..... | i, 1452; ii, 3129 |
| White Lake, La., improvement of waterways via..... | i, 921; ii, 2540 |
| White River, Ark.: | |
| Examination and survey..... | i, 1115 |
| Improvement at Devall Bluff..... | i, 1098; ii, 2666 |
| Improvement by open-channel work..... | i, 1094; ii, 2664 |
| Operating and care of locks and dams..... | i, 1112; ii, 2673 |

| | Page. |
|--|--------------------|
| Wicomico River, Md., improvement..... | I, 469; II, 2225 |
| Willamette River, Oreg.: | |
| Examination between Corvallis and Eugene..... | I, 1747 |
| Improvement above Portland..... | I, 1729; II, 3342 |
| Improvement at the falls..... | I, 1733; II, 3344 |
| Improvement below Portland..... | I, 1715; II, 3333 |
| Operating and care of canal and locks at Willamette Falls..... | I, 1744; II, 3350 |
| Willapa Harbor and River, Wash., improvement..... | I, 1748; II, 3353 |
| Willis River, Va., examination and survey..... | I, 549 |
| Wilmington, Cal., improvement of inner harbor..... | I, 1603; II, 3263 |
| Wilmington, Del., engineering district..... | I, 375; II, 2167 |
| Wilmington Harbor, Del., improvement..... | I, 406; II, 2182 |
| Wilmington, N. C., engineering district..... | I, 549; II, 2275 |
| Wimico Lake, Fla., improvement of waterway via..... | I, 796; II, 2443 |
| Winnebago Lake, Wis., improvement of Fox River..... | I, 1360; II, 3057 |
| Winnibigoshish Reservoir, Minn.: | |
| Construction..... | I, 1146; II, 2737 |
| Operating and care..... | I, 1151; II, 2739 |
| Winyah Bay, S. C.: | |
| Examination and survey..... | I, 648 |
| Improvement..... | I, 616; II, 2333 |
| Wisconsin River, Wis., operating snag and dredge boats..... | I, 1131; II, 2728 |
| Withlacoochee River, Fla., improvement..... | I, 752; II, 2413 |
| Wolf River, Miss., improvement..... | I, 868; II, 2501 |
| Wolf River (tributary of the Fox), Wis., improvement..... | I, 1360; II, 3057 |
| Women of Civil War, memorial to..... | I, 1905; III, 3725 |
| Woodbridge Creek, N. J., improvement..... | I, 327; II, 2132 |
| Woodbury Creek, N. J., improvement..... | I, 377; II, 2168 |
| Wrecks, etc., removal: | |
| Expenditures during the year..... | I, 44 |
| List of those removed..... | I, 1842 |
| Maine, battleship, removal from Habana Harbor..... | I, 1824 |
| Permanent appropriation for..... | I, 43 |

Y.

| | |
|---|--------------------|
| Yamhill River, Oreg.: | |
| Improvement..... | I, 1729; II, 3342 |
| Operating and care of lock and dam..... | I, 1745; II, 3352 |
| Yaquina Bar, Bay, and Harbor, Oreg., examination and survey..... | I, 1714 |
| Yaquina River, Oreg., improvement..... | I, 1683; II, 3309 |
| Yazoo River, Miss.: | |
| Improvement above mouth..... | I, 1070; II, 2640 |
| Improvement of mouth, including Vicksburg Harbor..... | I, 1085; II, 2651 |
| Yellow Mill Pond, Bridgeport, Conn., improvement..... | I, 183; II, 2051 |
| Yellowstone National Park, improvement..... | I, 1940; III, 3745 |
| York River, Va., examination and survey of channel to Back Creek..... | I, 507 |
| York Spit, Chesapeake Bay, Va., shoals opposite, removal..... | I, 434; II, 2201 |
| Youghiogheny River, Pa., improvement..... | I, 1279; II, 2957 |
| Youngs Bay, Oreg., examination and survey..... | I, 1747 |
| Yuba River, Cal., construction of restraining dams..... | I, 1810; II, 3399 |
| Yukon River, Alaska, improvement of Apoon mouth..... | I, 1787; II, 3380 |

Z.

| | |
|-------------------------------------|-------------------|
| Zippel Bay, Minn., improvement..... | I, 1163; II, 2744 |
|-------------------------------------|-------------------|



